

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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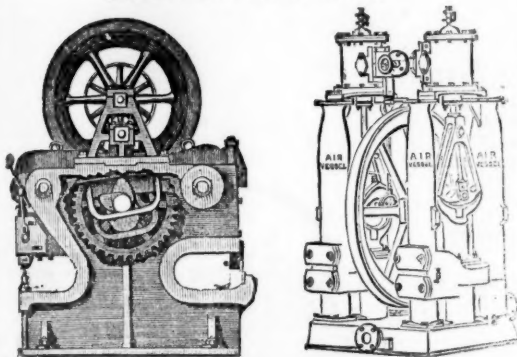
LONDON, SATURDAY, SEPTEMBER 21, 1878.

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NEW and INDESTRUCTIBLE ASBESTOS PACKING for
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PARIS,
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24-90, 27-60, 24-80, 26-10,
28-30, 27-10, 28-40, 28-70 metres. Total advance of south head-
ing during January was 121-30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
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sure was reduced to one-half atmosphere (7½ lbs.), showing
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against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
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NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
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where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
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The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
ing parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
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PER MINUTE—do not require a mechanic to work them—are
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short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
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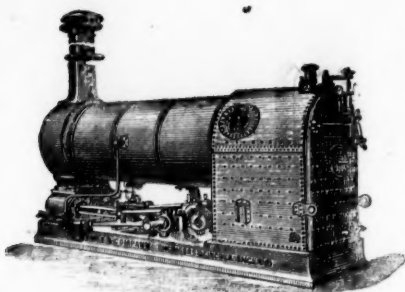
"7. Its greater power is some FORTY PER CENT. in favour of the
Ingersoll."

Medals awarded for several years in succession "For the reason
that we adjudge it so important in its use and complete in its con-
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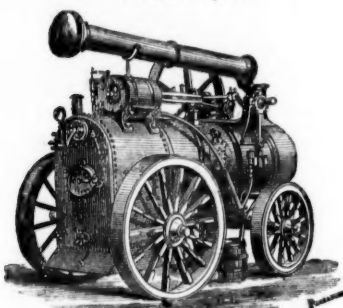
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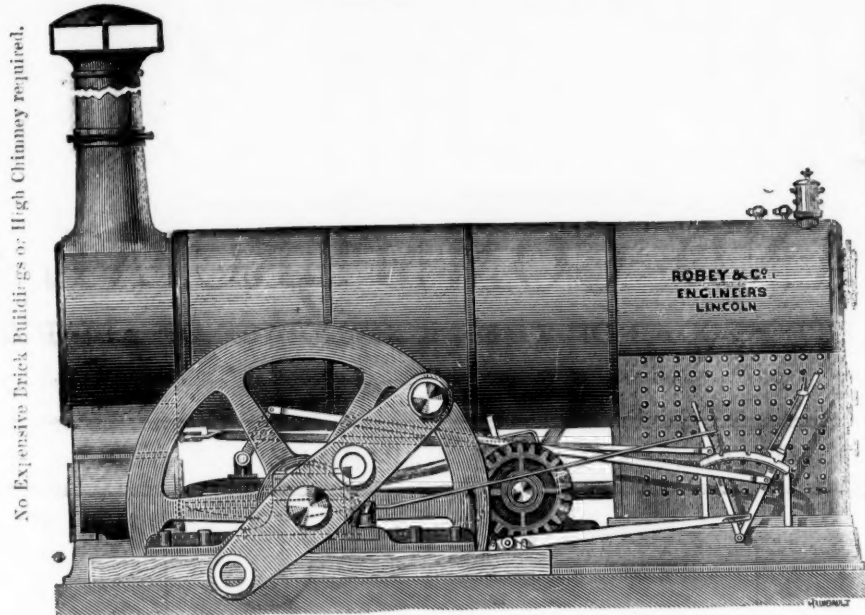
THE PATENT ROBEY FIXED ENGINE AND LOCOMOTIVE BOILER COMBINED, 2 to 10-horse power.



VERTICAL STATIONARY STEAM ENGINE AND PATENT BOILER COMBINED, 2 to 12-horse power.



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Some of the advantages of this New Engine are as follows:—

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This New Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable in saving time and expense in fixing.

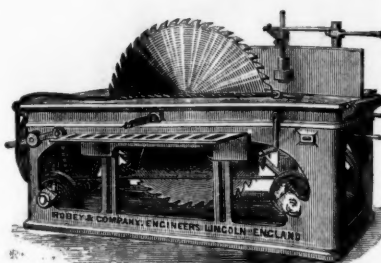
THE PATENT ROBEY FIXED ENGINE

(Also above illustrated) is admirably adapted for driving Rolling Mills, Saw Mills, Brick Machinery, Pumping Machinery, and all descriptions of Fixed Machinery.

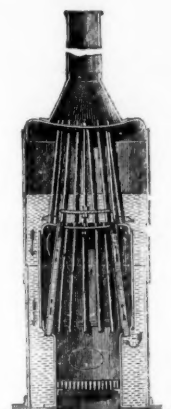
ENGINES UP TO 200 EFFECTIVE HORSE-POWER ALWAYS IN PROGRESS.

Prices and full particulars of all the Machinery here illustrated on application to the Sole Manufacturers,

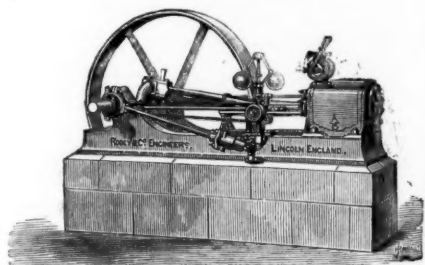
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PATENT VERTICAL BOILERS, 2 to 12-horse power.



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As the Fans are in a great measure self-contained, the necessary seats and connection with Pit are of a simple and inexpensive character. They can be arranged to be placed below ground when required, and also to work on

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(Estimates and further information will be prepared on receipt of the necessary particulars.)

FOR SINKING PURPOSES, and also for places where small quantities of air are needed for Ventilating purposes, a Special Fan is made, in various sizes, with small engine combined, complete, arranged for both forcing and exhausting air.

NOISELESS BLOWING FANS, for Smithy Fires, and other purposes.

TURBINE WATER-WHEELS, specially designed and adapted for use in Coal Mines, for high falls of water, for the purpose of developing water power, where it is available, for use in hauling, pumping, and other works.

The Firm, having had an experience of nearly twenty-five years exclusively in the above Special Departments of Engineering, are prepared to advise on any matter affecting the application of Fans or Water Power in Collieries or elsewhere.

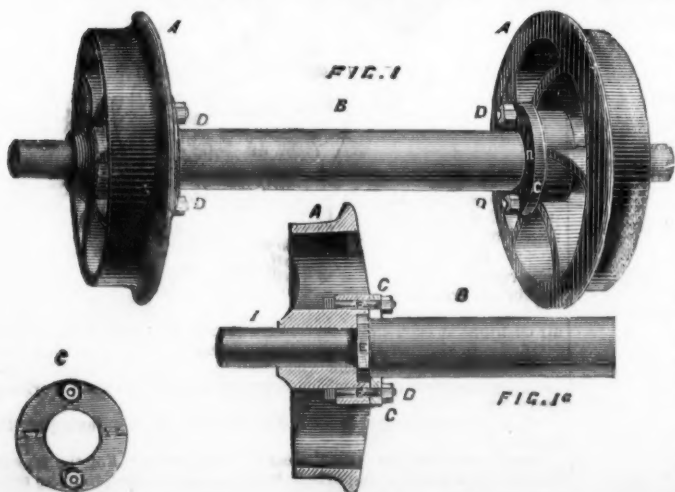
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JOSEPH FENTON & SONS,

MANUFACTURERS OF
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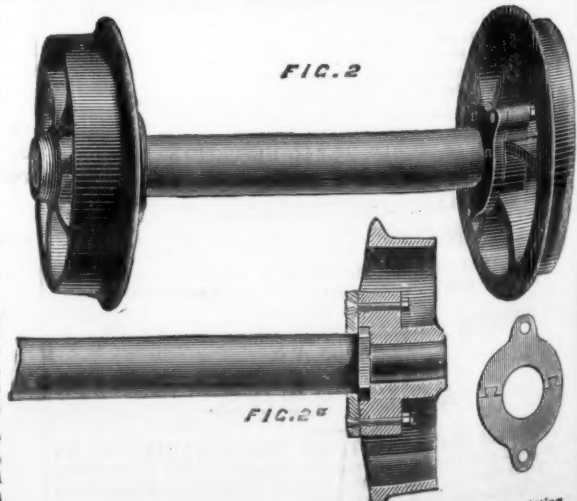
CRUCIBLE CAST STEEL CASTINGS,
Sykes Works, Eyre-st. & Bridge-st., Sheffield. London Office: 118, Cannon-st., E.C.
A New Patent Method of Fitting up Wheels and Axles.



Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings, and Figs. 2 and 2a for inside bearings. A A are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle, which is forged of solid steel; the axle is secured into the recess partly by being sufficiently tightly fitted to require driving home with a hammer, and partly by the washer. Around the axle adjoining the boss is fixed the washer, made in two parts and dovetailed, so as to allow of being fixed after the collar has been forged on the axle. The washer is secured to the boss by bolts and nuts, both in outside and inside bearings; in the case of inside, by means of lugs cast on the boss, and the washer made of corresponding shape; the washer is made of crucible cast steel. The only tool required for fitting is an ordinary spanner for outside bearings, and a box spanner for inside bearings.

Now what are the advantages of this method? You secure a simple way of fitting—it can be done by anyone who has seen it—the only tool required being a spanner; the wheels can be detached from or secured to the axle in a few minutes. The next



advantage is the perfect solidity attained, the wheel and axle practically becoming as one piece. The durability results from the toughness of the material, and the solidity secured in the fitting. Another thing is the wheels do not need to be put in the fire to detach them, as is the case in ordinary wheels. (N.B.—Our wheels cannot be injured by being heated and plunged into cold water, which would render other steel wheels perfectly brittle as glass.) Saving in fuel and wages is evident—no skilled labour being required to refit wheels in case of a strained axle. By adopting this system colliery owners may save hundreds of pounds sterling yearly.

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THE COAL PRODUCTION OF THE UNITED KINGDOM.

In last week's Journal we gave a complete resumé of the Mineral Production of the United Kingdom other than coal. In our present notice attention will be directed to the produce of our coal mines in the year 1877, its distribution, and consumption in manufacture, comparing the results with the year 1873, when coal attained an unusually high price. In February of the last-named year it will be remembered that the best Newcastle Wallsend sold in London for 52s. 6d. per ton, receding gradually till the close of the year, when it stood at 38s. 6d. per ton, while during the greater part of the present year (1877) the same quality of coal has been selling for 24s. and 25s. delivered by the merchant to the consumer. This simple fact will sufficiently show the important influence the price of coal exercises on our commercial industries, and render a comparison of results in 1877 and 1873 interesting.

From the volume of Mineral Statistics for 1877, recently published, the total output of the 3783 collieries in operation amounted to 134,610,763 tons; four years previously the output was but 127,016,747 tons; thus in the period referred to, the above figures indicate an actual increased production of upwards of seven and a half millions of tons. The yield of the respective coal producing areas of the United Kingdom for 1877 and 1873 appear below:

ENGLAND.	Coal fields.	1873-Tons.	1877-Tons.
North Durham and Northumberland...		12,204,340	11,975,250
Cumberland		1,747,064	1,515,783
South Durham...		17,436,045	19,235,150
Westmoreland		1,972	1,791
Cheshire		1,150,500	645,500
Lancashire, North and East		9,560,000	8,735,055
Lancashire, West		7,500,000	8,886,476
Yorkshire, West Riding...		15,311,778	15,952,500
ditto North Riding			8,150
Derbyshire			6,975,550
Nottinghamshire			3,895,750
Warwickshire			930,850
Leicestershire			1,149,590
Staffordshire, South, & Worcestershire.		9,463,559	9,841,191
Staffordshire, North		3,892,019	4,149,975
Shropshire		1,570,000	927,580
Gloucestershire			1,194,726
Somersetshire			
Devonshire		1,858,740	666,500
Monmouthshire		4,500,000	4,350,785
NORTH WALES.—Flintshire			855,750
Denbighshire		2,450,000	1,622,500
Anglesea			1,330
SOUTH WALES.—Glamorganshire			11,889,600
Carmarthenshire		9,841,523	526,450
Pembrokeshire			76,400
Brecknockshire			141,885
SCOTLAND, East		10,142,039	11,452,373
ditto West			6,871,733
IRELAND		103,435	138,722

Taking the great northern coal field of Durham and Northumberland in 1877 the total yield of the collieries shows an aggregate of 31,210,400 tons, compared with 29,640,385 tons in 1873, or an increase of 1,570,015 tons, equivalent to 5 per cent. Without following too closely the distribution of the coal of this coal field, the annexed figures show in a prominent manner some of the more important channels through which the distribution takes place by railway and foreign export in each of the years 1877 and 1873:

	1877-Tons.	1873-Tons.
North-Eastern Railway	10,439,768	10,792,280
Great Northern Railway	334,615	365,143
Midland Railway	157,314	143,896
Furness Railway	579,569	—
Manchester, Sheffield, & Lincolnshire Rail.	142,694	—
Coal exported to foreign countries	5,951,775	5,593,836
Coal ditto = in coal	381,868	337,340
Coal sent coastwise	5,882,502	4,637,244
Coal ditto = to coal	10,248	28,490
Colliery consumption	1,175,000	1,750,000
Pig-iron manufacture	1,656,056	1,949,447
Ironworks not included above	1,553,944	—
Local manufacture and domestic use	2,536,400	4,000,000

The coal used for railway purposes, which was an important item in each year, does not appear in the above statement.

The CUMBERLAND COAL FIELD shows a diminished production in 1877 compared with 1873 amounting to upwards of 230,000 tons; during the same period the coal shipped coastwise and exported from Whitehaven, Workington, and Maryport rose from 364,951 tons in 1873 to 490,854 tons in 1877; while the coal—the produce of the district—employed in the district rose from 500,000 to 695,091 tons. It must be borne in mind that large quantities of Durham coke are imported into the county and employed in the manufacture of pig-iron, the exact quantities do not appear, but the total quantity used in the Cumberland ironworks was 1,079,116 tons in 1873, against 1,027,869 tons in 1877, of which the district furnished a considerable proportion, as shown above.

The principal coal carrying railways in Cumberland are the Maryport and Carlisle and Furness Railways—the former, in 1873, carried for shipment and land sale 282,787 tons, compared with 268,718 tons in 1877, and the Furness Railways 395,920 tons, and 383,074 tons in each of the same years. The coal carried to London and other places by the London and North-Western Railway increasing from 348,404 tons in 1873 to 361,276 tons in 1877.

CHESHIRE COAL FIELD.—This district, like Cumberland, shows a falling off in 1873, the thirty-one collieries raising 1,150,500 tons against 645,500 tons, the output of thirty-six collieries in 1877. The London and North-Western Railway carrying 95,687 tons from the district, against 157,351 tons in 1877.

LANCASHIRE COAL FIELD.—Since 1873 an increase of output appears, as compared with 1877, of 621,531 tons. Of the production of 1877 the Lancashire and Yorkshire Railway carried out of the district 3,556,192 tons, compared with 2,871,805 tons in 1873, and 2,859,745 tons in 1874. The London and North-Western Railway carried out of Lancashire 5,415,063 tons in 1873, against 6,144,284 tons in 1877; other lines carrying smaller quantities.

YORKSHIRE COAL FIELD, and that area extending through the adjacent counties of Derby, Notts, Warwick, and Leicester, may be regarded as the one coal field, its united production in 1873 amounting to 26,879,778 tons, increasing to 26,912,290 tons in 1877. Of these quantities the Midland Railway carried the following tonnages in each of the years:

	1873-Tons.	1877-Tons.
Yorkshire	1,872,312	1,732,009
Derbyshire	5,197,550	5,155,152
Leicestershire	1,074,816	987,087
Nottinghamshire	907,000	1,295,479
Warwickshire	158,799	164,279

Total ... 9,210,477 ... 9,334,006

The Manchester, Sheffield, and Lincolnshire system received and distributed from the above districts 3,915,803 tons in 1873, compared with 4,604,427 in 1877. The Lancashire and Yorkshire from Yorkshire alone carried 1,870,452 tons, against 1,750,308 tons in 1877, considerable quantities being handed over to other lines for distribution. The Great Northern, in 1877, carried from the South and West Ridings of Yorkshire 1,575,956 tons, and from Derbyshire 441,226 tons; in 1873 the respective quantities were 1,497,236 tons and 441,226 tons, showing an increase of 78,000 tons. The total coal sent coastwise from Yorkshire ports last year was 156,577 tons, and the exports 1,021,551 tons, compared with 267,580 tons and 718,308 tons in the year 1873.

SOUTH STAFFORDSHIRE AND WORCESTERSHIRE.—The production of this area has increased from 9,463,559 tons in 1873 to 9,841,191 tons in the past year, the number of collieries increasing from 407

in the former to 466 in the latter year. Its distribution is thus accounted for in each of the years, by railway, canal, &c.:

	1877-Tons.	1873-Tons.
London and North-Western	1,138,293	971,525
Midland	163,903	106,484
Great Western	344,702	487,069
By canal to Birmingham	916,288	535,590
for works in mining district...	3,144,480	3,500,233
Domestic consumption in addition to		
Birmingham	1,775,550	1,750,000
By canal out of county	207,995	812,668
Colliery consumption	1,255,000	1,300,000
Used in manufactures	895,000	*

Total ... 9,841,191 ... 9,463,559

* This item is included in the quantity carried by canal for works in mining districts.

The Birmingham Canal Navigation extending through and intersecting the mineral fields of South Staffordshire, East Worcestershire, and North Warwickshire, carried in 1877 4,268,744 tons of coal, compared with 4,587,600 tons in 1873, distributing it in the surrounding districts. The Great Western Railway carried from South Staffordshire 344,702 tons in 1877, compared with 487,069 tons in 1873, the same railway system carrying into the county 294,316 tons and 397,069 tons respectively in each of the same years.

NORTH STAFFORDSHIRE.—These collieries in 1877 numbered 143. The output of coal 4,149,975 tons. In 1873 the 123 collieries working produced 3,892,019 tons. The distribution by railway and canal shows its disposal as follows in each of the years 1877 and 1873, distinguishing the quantities carried out of the district from that used for local consumption:

	1877-Tons.	1873-Tons.
North Staffordshire Railway	753,141	472,097
Local distribution by rail	609,879	476,454
ditto by canal	265,287	297,180
London & North-Western Railway	58,645	83,534
Great Northern Railway	14,043	6,746
Coal used at ironworks	650,000	681,508
Colliery consumption	149,000	129,000
Potteries, brickworks, &c.	750,000	750,000
Local consumption	900,000	995,500*

Total ... 4,149,975 ... 3,892,019

* This quantity includes coal used in mills and forges.

SHROPSHIRE COAL FIELD.—The output of 61 collieries in 1877 was 927,580 tons, against 1,570,000 tons in 1873. The London and North-Western Railway carried out of the district 104,642 tons in 1877, compared with 107,580 tons in 1873. The total coal used in the Shropshire iron furnaces in the manufacture of pig-iron in 1877 was 276,241 tons, compared with 407,876 tons in 1873.

GLoucester and SOMERSET COAL FIELDS.—The output of the coal mines in these areas show little variation. In 1877 the 122 collieries raised 1,861,266 tons; in 1873 the 126 collieries produced 1,858,740 tons. Of these quantities the Forest of Dean contributed 638,319 tons in 1877, against 790,374 tons in 1873. Of the coal thus raised the Midland Railway carried out of the district 200,253 tons, against 293,069 tons in 1873, and the Great Western from the Radstock coal field, in Somersetshire, 195,492 in 1877, against 237,372 in the year 1873, while the coal sent coastwise from Bristol and Gloucester amounted to 167,165 tons, and that exported, 7371 tons in 1877, compared with 394,418 tons and 11,609 tons respectively in 1873.

MONMOUTHSHIRE, according to the returns for 1877, produced 4,350,785 tons. In 1873 the produce is included with Breconshire and those collieries on the edge of Glamorganshire, giving a total of 4,500,000 tons.

SOUTH WALES COAL FIELD, by far the most important in the Principality, yielding coal almost smokeless, and of great value as a steam coal, for which it is largely exported from the principal shipping ports of Cardiff and Swansea. A considerable portion of the coal raised in this area is employed in the large ironworks, mills, and forges, tin-plate and the metallurgical industries, of which Swansea is the principal centre. The production of Glamorganshire in 1877 is set down at 11,889,600 tons, of which those collieries on the edge gave 789,150 tons from 245 and 23 collieries respectively. To this quantity must be added the 57 collieries in the other counties of South Wales, through which the coal field extends, yielding coal in the following proportion:

	1877-Tons.	1873-Tons.
268 ... Glamorganshire	11,889,600	
3 ... Brecknockshire	141,885	
10 ... Pembrokeshire	76,400	
44 ... Carmarthenshire	526,450	

325 Total of South Wales ... 12,634,335

Very reliable and complete returns of the production of coal are published annually by the authorities of the following parishes in the county of Glamorgan. The returns for 1873 are given side by side for comparison with those for 1877:

	1877-Tons.	1873-Tons.
Aberdare	1,645,906	2,054,879
Llanwddol	533,425	425,731
Ystradgynaf	2,492,867	1,940,566
Gelligaer	1,284,489	1,078,347

Total ... 5,956,687 ... 5,499,523

Following the distribution of coal in this as in other districts, the Great Western Railway shows an important traffic, carrying 4,689,399 tons in 1877, against 4,229,817 tons in 1873. The Taft Vale Railway and its branches in each of the same years carried 5,170,953 tons and 4,527,641 tons, which were distributed as follows:

	1877-Tons.	1873-Tons.
To Cardiff and Penarth Junction	4,458,479	3,423,925
Sold retail	292,796	383,261
To Quaker's Yard Junction	121,652	237,680
To Mountain Ash Junction	7,814	364,006
Conveyed over by other railways	288,870	93,185
To Brecon and Merthyr Junction	717	24,296
To Walnut Tree Junction	625	1,288

Total ... 5,170,953 ... 4,527,641

The London and North-Western Railway in 1877 carried to stations on their own and other companies lines 765,653 tons, against 239,160 tons in 1873. The Midland and Great Northern Companies also carry small quantities of South Wales coal to distant places received from other lines. From the following table it will be seen the relative proportion and extent of the coal sent coastwise and exported from the several ports in each of the years 1877 and 1873:

Ports.	Coastwise.	Foreign.	Coastwise.	Foreign.
	1877-Tons.	1873-Tons.	1877-Tons.	1873-Tons.
Newport	824,100	613,129	780,001	305,520
Cardiff	790,903	3,852,517	965,822	2,618,442
Swansea	252,165	736,653	256,228	556,326
Briton Ferry	213,777	18,096	—	—
Neath	—	—	192,276	48,484
Port Talbot	57,046	3,110	9,924	4,257
Porthcawl	99,305	—	91,467	6,561
Llanelli	114,233	59,912	149,956	94,314
Milford	24,937	—	44,475	300

Total ... 2,376,466 ... 5,283,417 ... 2,490,149 ... 3,634,204

THE COAL FIELDS OF SCOTLAND.—These coal areas extend from the eastern coast of Scotland around the Firth of Forth to the west coast of Ayr. Glasgow may be regarded as the great mining and metallurgical centre. In Lanarkshire and Ayrshire a large proportion of the coal wrought is employed in the manufacture of gas, the Cannel coal being specially employed and in great request. The yield of the Scotch coal fields in 1877 amounted to 18,320,074 tons, of which 6,867,701 tons were raised in the Western district, and 11,452,373 tons in the Eastern district of Scotland. The number of collieries in operation in the two districts amounting to 527, of which 222 were in the Western and 305 in the Eastern district. Comparing the foregoing data with 1873—a year of abnormal pro-

duction, when prices and miners' wages ruled high, and when many of the industries of the counties suffered in consequence of the high price of coal—the production of the coal mines of Scotland was but 16,857,772 tons, of which the Eastern district, with 260 collieries, gave 10,142,039 tons, and the Western, with 239 collieries, gave 6,715,733 tons.

RAILWAY DISTRIBUTION OF SCOTCH COAL.—The information on this subject is very complete, the railway companies furnishing most comprehensive details. The Caledonian Railway, for example, in 1877 received the following quantities of coal and gross from the collieries on their line, amounting in the aggregate to 6,646,254 tons, compared with 5,257,759 tons in the year 1873. The details afford interesting data for comparison:

Counties.	1877-Tons.	1873-Tons.
Lanarkshire	6,327,272	5,149,648
Stirlingshire	52,018	46,903
Edinburghshire	72,180	39,033
Renfrewshire	9,894	14,029
Ayrshire	52,477	—
Linlithgowshire	95,705	3,874
Dumbarshire	—	4,272

Total ... 6,646,254 ... 5,257,759

Imported coal carried inland... 36,708 ...

The coal above referred to was thus disposed of, as shown by the railway returns:—Carried for shipment in 1877 1,330,122 tons, compared with 995,020 tons in 1873; passed on to other lines, used by the company for locomotives and stations, and by the public (for domestic consumption) and ironworks, 5,316,132 tons, compared 4,262,739 tons in 1873. Again, the North British Railway received coal in the following proportion from the undermentioned districts, amounting to 4,682,128 tons, against 4,016,351 tons in 1873, showing an increase of nearly 17 per cent. in the period referred to:

Districts.	1877-Tons.	1873-Tons.
Canobie	44,174	48,596
Fifehire	1,154,893	963,405
Monklands	2,798,469	2,410,459
Plaskett	21,368	39,854
The Lothians	564,954	447,722
Other collieries	98,250	106,315

Total ... 4,682,128 ... 4,016,351

Considerable quantities of coal are also distributed by the Glasgow and South-Western Railway, as shown in the subjoined statement:

	1877-Tons.	1873-Tons.
For home use	1,152,253	973,217
For shipment	1,294,332	1,190,046

Total coal traffic ... 2,446,585 ... 2,163,263

Beyond this the extent of the shipments of coal to other ports of the United Kingdom coastwise appear as follows:—1,278,783 tons in 1877, against 1,324,985 tons in 1873; while the exported quantities foreign show 2,065,391 tons, against 1,523,914 tons in 1873.

COAL FIELDS OF IRELAND.—The 49 collieries raising coal yielded 138,722 tons, compared with 34 collieries and 103,435 tons in 1873, the imports of coal into Ireland from Great Britain amounting to 2,732,693 tons in 1877, against 2,562,619 tons in 1873.

COAL EXPORTED TO FOREIGN COUNTRIES.—The exports in 1877 of coal, coke, cinders, and patent fuel amounted to 15,358,828 tons, and that shipped for the use of steamers engaged in the foreign trade, 3,661,552 tons, or a total of 19,020,380 tons, equivalent to nearly 15 per cent. of the total annual produce. In each of the previous years the respective quantities stood as follows:

	1874-Tons.	1875-Tons.	1876-Tons.
Exported	13,927,205	14,475,036	16,299,077
Use of steamers	3,140,383	3,278,249	3,564,524

Total ... 17,067,588 ... 17,753,285 ... 19,863,601

Looking to the past, the official returns show that in the year 1821 the exports were but 170,941 tons; ten years later, 356,459 tons; in 1841 the increase was four-fold—1,497,187 tons; in 1861 the increase was nearly six-fold, while in 1871 the exports reached 12,549,874 tons. In later years the respective quantities appear above, and no doubt, with returning prosperity to the kingdom, will proportionately increase. Commercial reports of late indicate a more favourable state of the many industries depending on the coal trade, which in turn will induce increased demand and production, and conduce alike to the interests of the employer and the employed.

In concluding our notice of the coal production in 1877 it will be perceived by a perusal of the details of the volume referred to that the quantity of coal carried in 1877 by railways and canals was nearly 3,000,000 tons in excess of what was carried in the previous year. In the shipment of coal, however, a decrease appears, reducing the actual excess of traffic in coal to about 2,000,000 tons.

The Keeper of Mining Records directs especial attention to this point, inasmuch as the results of his inquiries show an increase of nearly 400,000 tons beyond that ascertained by Her Majesty's Inspectors for the same year. He further adds that to each of the collieries, numbering nearly 4000, a circular is issued early in each year, and returns are very fully made, giving in most cases the distribution of the coal, and the quantities used in manufacture. Further he adds, and with much force, to which we can add our testimony, that the experience of 30 years, devoted to the work of the Mining Record Office, has made him familiar with every mineral and metallurgical industry of the country, and during which period he has gathered many friends, by whose assistance he has been enabled to continue with regularity the publication of a work of admitted national importance.

Comparing the commercial value of the mineral statistics with the annual reports of Her Majesty's Inspectors of Coal Mines, it may be briefly stated that while the Inspectors' reports afford reliable data of the output of our coal and metalliferous mines under inspection, of the accidents and loss of life yearly occurring, yet they are far from comprehending the total mineral produce of the country, inasmuch as many districts in which mining operations are carried on by open workings, as, for example, in Northamptonshire and Lincolnshire, and Oxfordshire, where iron ore is largely wrought, no record is found in the Inspectors' reports, as such workings do not come under the operation of the Act by which such returns are obtained.

On the other hand, the Mineral Statistics, published yearly since 1854, gives the produce of all mines, whether or not under inspection, giving the quantities and values of the ores raised, the total production of iron ore, its value, and the yield of the ironworks and coal consumers in the production of pig-iron, with detailed information of the malleable ironworks, and their resources in mills and forges, works for the manufacture of Bessemer steel and steel by the Siemens-Martin process, the production of tin-plate and the distribution of coal by railway and canal, and a mass of information bearing on our mining and metallurgical industries of great commercial importance to all engaged therein, the information in all cases being accorded in confidence and with promptness, to which the Keeper of Mining Records bears ample testimony.

We could well wish to see the Mining Record Office's sphere of usefulness extended, and its small but efficient staff encouraged in its labours by a prompt response in the future to such circulars of inquiry as may issue from so useful and important a department of the public service.

At Reskedennick, Camborne, on Wednesday, Sept. 18. Capt. JOSEPH VIVIAN, in the 86th year of his age. Capt. Vivian was many years in his early career manager of Cook's Kitchen, more recently of North Roskear, North Crofty, and several other mines. No man in the west enjoyed more universal respect, won by upright and honourable conduct through 70 years of active life. For practical knowledge in the development of underground operations or the laying of dressing-floors Captain Vivian had no competitor. His loss is deeply regretted by shareholder and working miner alike.

At Camborne, on Tuesday, Sept. 17, Capt. EDMUND ROGERS, aged 56 years, late manager of Wheal Agar.

Original Correspondence.

THE TRADES UNION CONGRESS.

The delegates from the various Trades Unions throughout the kingdom met at Bristol on the 9th inst., and, as usual, managed to eke out a week in the transaction of business supposed to be for the benefit of the bodies they represented. But whether the working men who sent them to discuss various trade and other matters will be advantaged by their gathering we think is even more than doubtful, for those who met and were well paid by the *bona fide* tailors evidently look upon such meetings as pleasurable trips, and generally manage to have them fixed for places where there are the most attractions, and we must certainly congratulate them upon having selected for their next Congress a city so rich in historical associations, architecture, and in the neighbourhood of such delightful scenery as the modern Athens. The attractions of Edinburgh are certainly far before those of Birmingham, Oldham, and Cardiff combined, those being the other towns proposed, so that the capital of Scotland was carried by a large majority. As to the business done the programme marked out varied very little from that of Glasgow, Leicester, or Newcastle, and might have been stereotyped for one meeting after the other. There was, however, no allusion made as to the present depressed state of trade, or the best means for improving the great industries of the country further than by the old and exploded theory of limitation of production, to which we shall hereafter allude. Several subjects, however, were discussed which would be beneficial to the leaders of the working classes, but which could not be of any importance to the rank and file. The subjects for discussion included the mode of appointing unpaid magistrates, the codification of the criminal law, abolition of imprisonment for debt, doing away with the qualification of jurymen and their payment, and the appointment of a considerable number of working men as assistant sub-inspectors under the new Factory and Workshop Act, &c. The carrying out of some of these objects could not fail to put money in the purses of those who style themselves the leaders of the working men, but who are wise enough not to work themselves, and who would always be ready and find time to occupy any temporary position that brought sufficient remuneration with it. If we take the jury laws, and lower the qualification, or, rather, do away with it altogether and pay the juryman, then the system which has worked so very well for some hundreds of years would be entirely done away with, to be replaced by one created entirely for the benefit of a few men who only work when they are compelled, but as a rule live on the labour of others. But much would depend upon the amount of remuneration, for if a man was only to receive one or two shillings for spending an entire day in a court of justice very few workmen, we fancy, would feel inclined to seek the office of a jurymen; but, on the other hand, if the rate of payment was high then the position would be sought for by a class of men ever on the look out for anything by which money could be easily obtained, and who would soon bring trial by jury into something akin to contempt. There is certainly no reason why the intelligent working man should not sit upon juries, but we do not see why he should be paid in carrying out one of the most important duties that can devolve upon a member of the community. In another direction the members of the Congress had again an eye to the loaves and fishes, for it was proposed by a gentleman from Accrington that the Parliamentary committee should take action to secure the appointment of a considerable number of "respectable working men" as assistant sub-inspectors under the new Factory and Workshop Act. We may assume that the "respectable working men" must at least include the delegates, for they look upon themselves as the *crème de la crème* of the working body, and eligible for any position from M.P. downwards, provided there is a good salary attached. The resolution, however, was not allowed to pass as proposed, for a Mrs. PATTERSON proposed an amendment for inserting the words "and women," and this was carried on a division, so that the "working men" are not to have all the good things to themselves in the event of assistant sub-inspectors being appointed from the trade unionists. The Parliamentary committee was also instructed to endeavour to obtain a more representative Royal Commission than that nominated by the Government, to consider the codification of the criminal law. This we suppose could most effectually be carried out by placing several of the delegates on the Commission, as they would then not only have a status over the ordinary workers, but would also have a profitable employment that would probably last them for a considerable time.

As might be expected, Mr. MACDONALD, M.P., addressed the Congress upon his Compensation for Accident Bill, and asked for petitions to be sent in its favour from every workshop, factory, railway, and mine, and if that were done the pressure brought to bear on the House of Commons would be such that a law would be passed satisfactory in its character to the working men. We have certainly no fear that such a bill will ever pass the House of Commons, as it would be in the highest degree unfair to the employers of labour, and in not a few instances would be positively ruinous. This we have pointed out on several occasions, whilst the Committee of the House of Commons reported with respect to it that no case had been made out for any alteration in the law relating to the liability of employers to their workmen, "except in cases of personal neglect on the part of the master, or where there is delegated authority." Surely this is plain enough, and Mr. MACDONALD must know that his Bill will never pass—at least in its present shape. Were it to become law it would only result in making workmen, miners, and others more negligent than they now are, lead to endless litigation, and drive capital out of legitimate undertakings, the first to feel the effects of which would be the working classes.

The most interesting feature of the Congress was the address by Mr. JOHN MORLEY, on "Over-Production," which was certainly an able paper from the standpoint of the writer. The present depression of trade Mr. MORLEY considered was the result of over-production, and the only remedy for that is to be found in restriction of labour so as to bring production and consumption more in harmony with each other. He pointed out the fact that, owing to the coal-famine years, the collieries have only been working during the last two years about seven days in the fortnight, whilst many of our great ironworks have failed, owing to the excess of production. But the falling off in the requirements of our products have been the result of what in hackneyed phraseology is termed the law of supply and demand, and we do not believe the position of either employer or workman would be improved by artificial restraints on the output of our mines, ironworks, or manufactories. Limitation of production as proposed is for the purpose of increasing the price of various commodities acted upon by that process. But will that really benefit the suffering master and workman? We cannot see that it will do so either at home or abroad. If you raise the price of one article of general consumption the whole community is taxed for the benefit of those engaged in a certain business. But as nearly all trades are now suffering, and you advance the cost of goods of nearly every description, where is the gain? As it is, we have limitation of production in almost every branch of trade, in a great measure owing to the exceptional prosperity which prevailed a few years ago, and which led to an immense amount of capital being invested in so many works which at that time were making very large profits. But even if the English public were taxed for the benefit of one or two particular branches of trade, we have still our exports to look to, and to raise the price of them, despite what Mr. MORLEY says to the contrary, would be to throw a large portion of the foreign trade into the hands of those who are trying all they can to obtain it, and who are able to compete with us in many of our markets. If we take coal for instance, we find that about one-seventh of all that is raised in the country is exported, but so keen is the competition that our colliery owners have for a long time been selling it at prices that leave no profit whatever, and even with that sacrifice are barely able to hold their own. What benefit, we should ask, would be obtained were we by limiting our production, and only sending half the coal we do now out of the country, and throw the remainder of the trade into the hands of foreigners? The result, in our opinion, would be that our miners would have to work fewer days a week,

without much additional pay per day. The same remarks apply with equal force to the iron trade, for reduce our exports, and the men would have less to do as a matter of course, for prices cannot be raised abroad, seeing that contracts between home producers and foreigners are remarkably close in every way.

However, another Trades Congress has passed away without much being done besides a great deal of talking, so we may well ask the working men who have had to pay for the excursions of the delegates what value they have received for their outlay?

THE GUIBAL FAN.

SIR.—I should be glad to see explained in the Journal—
1.—The use and effects of the water-gauge placed on a stopping where return air passes in mine.
2.—How to calculate pressure in pounds from water-gauge of air.
3.—Their use in connection with the Guibal fan.

EXHAUST.

THE GUIBAL FAN.

SIR.—I have read the article in the Journal of Sept. 7 on the Guibal fan, but it does not give me all the information I should like. I shall be greatly obliged if the writer of the articles on the Guibal fan can furnish me with the information.

F. G.

Hill Top, Unstons.

THE GUIBAL FAN.

SIR.—I shall be obliged by the writer of the article on Guibal's fan stating in next week's Journal how the constant 5.186 is obtained in the formula you give for calculating the useful effects in horse-power?

M. E.

THE GUIBAL FAN.

1.—The air on the return side of a stopping is of less density and pressure than that on the intake side, owing to frictional resistance in passing through the airways and to the heat of the mine. When a water-gauge is placed tightly in a stopping this difference of pressure is shown by the difference in level of the water in the two limbs of the gauge. It follows that the nearer the stopping—where the gauge is tried—is to the upcast pit in a mine, the greater will be the difference of level, or height, of water-gauge. If placed at the fan, at the top of the upcast pit, the gauge will show the resistances both in the mine and in the pits.

2.—A column of water 33.92 ft., or 407 in., in height, has a pressure of 147 lbs. to a square inch. Five inches of water-gauge would be a pressure of $\frac{147 \times 5}{407} = 180$ lbs. per square inch, or 25.92 lbs. per square foot.

3.—The water-gauge applies equally to the Guibal fan or furnace ventilation. It shows the effect of long and contracted air passages in a mine. If a fall or obstruction to the place in an airway of the same mine the gauge would rise; on the other hand, if in the same mine the airways were enlarged throughout, the water-gauge would show less, owing to a part of the drag or resistance having been removed.

4.—The constant 5.184 is the pressure per square foot of 1 inch of water-gauge: thus, $\frac{147 \times 1}{407} = .36$ lbs. per square inch, $.36 \times 144 = 5.184$ lbs. per square foot.

LONDON COAL SUPPLY.

YORKSHIRE AND DERBYSHIRE DIFFERENTIAL COAL RATES BY RAIL.

SIR.—The general manager of the Great Northern Railway Company stated, in answer to Question 11,542 Great Northern (Spalding to Lincoln) Bill—"We expect to carry coal to Sutton Bridge Dock from Derbyshire at same rate as to Grimsby Dock from South Yorkshire, so as to restore the balance of power so far as export is concerned." When the Great Northern give such accented proof of their deep anxiety to nurse the Derbyshire coal traffic, *leur dernier enfantement*, can they, with any semblance of propriety, apart from justice, withhold from the Yorkshire coal field *leur premier amour* analogous treatment? Boston presents a much shorter distance from the collieries than either Sutton Bridge Dock or Grimsby Dock. Coal can be delivered via Boston and Boston Deep from the pit's mouth into the Metropolitan Consumer's premises at upwards of 5s. a ton saving on rail and attendant expenses, and 4s. on Tyne shipment. Via Boston, Yorkshire, and Derbyshire coal will be placed on a perfect equality as to through rate to London, thus abrogating all differential cost of transit.

To avoid encroaching too much on your valuable space, my correspondence in your preceding numbers presents an exhaustive development. To Question 11,571 the general manager of the Great Northern replied—"I have lost faith in the promises of the South Yorkshire coalowners." In the face of so startling an announcement must the most magnificent harbour in England, Boston Deep, be abandoned. Now, if the coalowners comprising the most powerful "sommites" of the land give themselves up to an "assoupissement" or morbid nonchalance, no wonder that the Great Northern, stimulated by their apparently supine inaction simultaneously with their unmistakable oblivion of the imperious necessity of the association of capital to triumph over the insurmountable difficulties of partial individual efforts in the counteracting organisation of an improved system of marine transport (dispatch thro' rigorously eschewing shipment in docks, and avoiding breakage by conveyance of twice screened large coal in sacks, &c.) forming the absolute condition of rescue from the thraldom which oppresses their coal vend, and withholds from them the indisputable monopoly of the metropolitan coal supply. The Great Northern are quite behind the age in their first attempt to ship coal. The latest improvement by the Tyne Commissioners is the superseding of docks by shipment in the stream, which *modus operandi* is to be seen within the precincts of the borough of North Shields. Docks entail an immense detention, vide my letter in last week's Journal.

Mr. J. R. Scott, Registrar of the Coal Exchange, states in evidence—"Facilities of dispatch alone render freights low," which Boston, shipping in deep water stream, will be capable of giving, and not so with Sutton Bridge nor Grimsby Docks. The eminent coalowner and Chairman of the South Yorkshire and North Derbyshire Coalowners' Association, Mr. Robert Baxter, states in evidence—"What cheapens immensely the cost of transit by sea is dispatch." Further, that a reduction of 8d. a ton transit is quite enough to command the London market. What must the effect of 5s. be via Boston?—Boston Deep, against which neither the general manager nor the chief engineer of the Gr-at Northern have alleged anything in their evidence in answer to questions 11,542 and 11,245, bearing upon the proposed route, whether the Great Northern will it or not become the chief coal route to London, circumstantial evidence of a decided feeling against Boston not being wanting. They are entreated not to delude themselves with the vain hope of retaining their London coal transit—the march of progress renders such as irrevocable as their 1871 campaign indelible in the annals of railway exploitation dare be renewed. Who will make bold to set bounds to the transforming enterprise, as yet undreamt of, to be accomplished both on land and water, Nature having done all that could be expected of her in respect to water transport for this country.

Mr. Moon, Mr. Allport, Mr. Oakley, and Mr. Swarbrick—the latter in the face of stating they cannot compete with water transport, which penetrates into the innermost recesses of their far inland system, entailing such an awful drain upon the resources of the Great Eastern by their 1878 Parliamentary contest—all state they cannot compete with marine transit. The most eminent railway counsel states—"No one has displaced any coal transit by sea and never will." What does the eminent manager of the largest coal-carrying line to London say? He distinctly states in his evidence on pre-cited Bills—"We cannot carry coal any cheaper than from 0.20d., 0.23d., to 0.24d. per ton per mile," exclusive of trucks, whilst coal (via Boston) by screw collier, as proposed, costs under 0.06d. per ton per mile. During the period of the coal war, when the Times City article of June 5, 1871, stated notwithstanding their terrific railway

loss at the rate of 800,000Z a year in the carriage of coal to London they did not succeed in driving the screw collier out of the coal trade. Mr. Allport states in evidence in pre-cited Bill the rate then was 0.250d. or 0.265d. per ton per mile. Mr. Briggs, Chairman of the West Yorkshire Coal Masters' Association, gave evidence that he ships coal to the Nene on which Sutton Bridge is situated 3 miles from its confluence with the ocean, so that we have Yorkshire sea-borne coal, which traffic the Great Northern will not be able to annihilate with the introduction of Derbyshire weighted with a long-head. We shall ship coal in Boston Deep on board of ships discharging inward cargoes at Wisbeach and Sutton Bridge at much under what can be done at Sutton Bridge Dock. Mr. Richard Cory, the very largest coal importer in London, states in evidence in said Bill—"There is not the slightest chance of the rail competing with sea transit, even at the reduced Gr-at Eastern 'farthing' rate." Sir Edward Watkin stated in the 1871 Coal Bill—"The time is coming for a larger amount of access to London for coal. No such event in history occurred as that of the London coal supply, which a few years ago was only 1,000,000 tons, is now (1871) between 6,000,000 and 7,000,000 tons. According to Mr. J. R. Scott's evidence in pre-cited Bill in 1878, 9,000,000 tons.

WILLIAM JOSEPH THOMPSON,

6, Fitzwilliam-road, Clapham, Sept. 19.

RAISING WATER FROM MINES.

SIR.—I was not aware until the other day that my "simple" invention for raising water from mines had attracted notice in scientific journals. I took out a patent on Dec. 18, 1877, giving specifications and drawings. In the *Mining Journal* of August 24 appears a letter signed "Mechanic." This gentleman describes very accurately the general process of working, and gives me credit for this—not the first of my inventions. But there is one thing he does not seem to understand, and yet this is the kernel of the nut which he and others have failed to crack. He says—"We all know that many of the most simple inventions are the most efficient, and it may be so in this case, although it appears to me that in practice the raising of water from any great depth will be impossible, for it seems that either the distance between the bucket and the fixed valve would be too great, or else that there would be such a heavy column on the bucket that the valve therein would never open whilst making the down stroke."

If "Mechanic" had understood, as he pretends to understand, my invention, he could not have made such a blunder as this. The cylinder confines the water within given bounds, and can be lengthened to any extent. What seems to puzzle him is a fixed valve. I have got no fixed valve. When the bucket goes down the valve must necessarily be open to let the water come up, and therefore it could not be shut, as "Mechanic" supposes. When the bucket comes up the valve then closes, for the simple reason that it cannot help itself. Any man of ordinary intelligence would see that a closed valve could not be sent to the bottom of a shaft, and that in coming up the pressure of the water would shut it, as the pressure of the water in going down would keep it open.

However, to satisfy the doubts of "Mechanic" and others interested in my invention, I may say it is in working order at my colliery at Wylam, where I shall be glad to let gentlemen interested in the question of raising water from mines see the machinery in full operation as a pump and balance.

ROBERT DUNN.

Wylam-on-Tyne, Sept. 17.

BORING MACHINES.

SIR.—It is an old story that as soon as anyone brings out a new appliance of real practical value there are always people who, without taking the trouble to master any of the details, make it their business to run down the invention and revile the inventor. Mr. H. Waddington in last week's *Journal* made an unjust and unsustainable attack both upon Mr. A. Brocklehurst and upon myself. For my own part I would treat his communication with the silent contempt it merits, leaving unprejudiced readers to decide between us; but when he says that Mr. Brocklehurst's "statement is simply untrue," I must ask the public to calmly consider what grounds exist for the writer thus to gratuitously brand an old man of unblemished character as a liar. Should anyone, after reading the remarks I am about to make, still place the slightest belief in the justice of Mr. Waddington's shameful accusation, let him visit the Magpie Mines, where he may convince himself far better than I can convince him that every word Mr. Brocklehurst has written is the plain truth.

Which of Mr. Brocklehurst's statements can Mr. Waddington show to be untrue? Certainly not the one that an Ingersoll drill was worked in the Magpie level, nor that the air-compressor was found incapable of driving more than one Ingersoll drill, nor that they could not work satisfactorily with less than 65 lbs. pressure; and, knowing as I do the long experience of Mr. Brocklehurst, and his intimate acquaintance with mining operations, not only at the Magpie Mines (where, by-the-by, four systems of rock-drills have been tried) but also in other countries, I would rather take his opinion on the relative merits of boring machines practically considered than I would take Mr. Waddington's, whose general remarks lead me to infer that his knowledge of this subject, like his experience of the limestone in the Bakewell district, is extremely limited. From the inconsequence of the second paragraph of Mr. Waddington's letter I am somewhat puzzled to ascertain what he really wishes to make public beyond the well-known fact that compressed air shows a slightly higher pressure on the gauge as we descend to greater depths; but this phenomenon has nothing to do with the case at Magpie, for there the working end of the level is at a higher elevation than the air-compressor. But Mr. Brocklehurst, being a practical man, and founding his reasons on experience, knows that when air is drawn for 1200 yards through 1½-in. piping there must be great friction, and when the machines are driven at this distance from the compressor there must be a considerable decrease in the pressure. The statement that many other drills will work at one-fifth the pressure of 30 to 40 lbs. is doubtless correct; so will my machine. But what drill would prove remunerative when worked only with motive fluid at so low a pressure? In dealing with this question, do let us treat it practically and not childishly. Mr. Brocklehurst's statement was clearly that 30 to 40 lbs. is the maximum actual pressure now available for the boring machine, and from very many years' experience I do not believe that any other drills in the world besides mine will with that pressure do the work mine are now doing, and Mr. Brocklehurst and many other unprejudiced and experienced men who have seen my machines in operation are of the same opinion.

I am not sure what was the size of the Ingersoll drill worked at the Magpie adit. At present they work with one of my No. 1 machine of 2½-in. cylinder and two No. 2 3¼-in. cylinders, and the results have proved that the same compressor which gives sufficient air for the two large machines to bore effectively could with difficulty supply the small Ingersoll with motive fluid. Again, my small (2½-in. cylinder) machine requires air at but 30 lbs. pressure (and a very small volume of that) to bore effectively. The inference any sensible man must arrive at is that when two of my large machines work effectively with a less pressure and consume less motive fluid than one small Ingersoll my system must be preferable.

Mr. Waddington insinuates that my machines have merely been tried above ground, whereas the fact is that, with the exception of the trial at Levant du Fleuve all the comparative trials I have mentioned have been carried on in mines. It may be that the Cornish granite and tinstone is harder than the tough limestone at present encountered in the Magpie level; but it is a known fact that the rock at Pribram, in Bohemia, and in the Swedish iron mines, particularly at Dalkarlsberg, is at least equally hard, and in both those places my machines have excelled all others that have been tried. The density of a rock does not necessarily constitute the chief difficulty in boring, for tough limestone is often more difficult to drill than hard Cornish granite, a fact of which Mr. Waddington does not seem to be aware.

With regard to Mr. Edwards' letter, I did not consider that it was written in such a bad spirit as many of the rest, nor do I see that it contained any points requiring an answer. As Mr. Wad-

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ington has reopened the subject, I may now remark that Mr. Edwards could know as little of my motive in buying his patent as I know of Mr. Waddington's motive in writing his letter. I consider my machine, of which I have published a full illustrated description in the "Application of Machine Power in Rock Drilling," to be the very best known, and I am convinced that ere long, notwithstanding the strenuous exertions of an opposing faction, it will be universally adopted. It will be interesting to observe if those self-styled disinterested writers who now use such great efforts to run it down will then have the moral courage to frankly admit they were in the wrong.

RICHARD SCHRAM.

London, Sept. 18.

ROCK-DRILLING MACHINERY.

SIR,—I have read the letters from your various correspondents on the important subject of rock-drills, and, speaking generally, have been a little surprised at the way in which the writers have thought it wise while dwelling upon the mechanical excellencies of certain machines, and the speeds at which trial bore-holes could be put down, to omit affording information as to actual driving extending over a length of time. It is obvious that to the mining public it is the gross results obtained which are all important. In this connection I send you for publication, with the permission of the Messrs. Taylor, their last report to the directors of the Halkyn Deep Level Mining Company. Since August 20 the heading has been driven 67 yards, making a total of 400 yards, and the last two weeks driving have been 17 yards each.

In the present depressed state of mining interests the importance of any means by which ground can be rapidly opened up can hardly be overestimated. I shall therefore, with your permission, return to the subject, giving you the results obtained in driving a tunnel heading for the Great Northern Railway Company, where the character of the rock is entirely different to that of the Halkyn limestone. I am far more interested in the work done than in the machinery by which the results are obtained, hence I shall be quite glad to hear from any of your numerous correspondents who may be able to help me to get on quicker than I am doing. Of course I could pay no attention to anything except advances actually obtained in the course of regular work.

FRED. BEAUMONT.

Westminster Palace Hotel, Sept. 20.

To the Directors of the Halkyn Mines Drainage Company.

Deep Level Mines, Aug. 20.—During the four months which have elapsed since our report to the adjourned general meeting, held on April 24, the Deep Level has been extended 249 yards, and a steady increase in the rate of advance has been made. For the four weeks ending May 23 the distance driven was 41 yards; for the four weeks ending June 20, 46 yards; for the four weeks to July 18, 58 yards; and for the four weeks ending Aug. 16, no less than 63 yards. A new boiler of greater capacity has recently been provided for the air-compressing engine; and, as all the machinery is now in excellent working order, we have every reason to think that this high rate of speed will be maintained, so long as the ground is similar in its nature to that at present met with. The rapid progress made—upwards of 20 times hand-labour speed—is, we consider, due in a great measure to the system on which the drills are made. These machines, which are the most effective we are acquainted with, where the highest rate of speed is required, are very simple in construction, and taking into consideration the immense force of the blows struck, are liable to but a small percentage of breakage as compared with other drills that we have seen in use. The level has been extended by the contractors a distance in all of 333 yards. The vein for the last 8 yards driven varies from 2 ft. to upwards of 4 ft. in width, and is most promising in its character.

Lead ore has been met with at different points, and although not in sufficient quantities to be of value in the level itself, yet there is every indication of the presence of productive ground above. Several joints have been intersected, showing the position of east and west veins crossing the Deep level vein at right angles, and one which was passed through last week appears especially worthy of exploration, running, as it does, parallel to the Panty Gwynn vein, from which such large quantities of rich lead ore were obtained in former years. The roof of the old level has now been raised to a height of 6 ft. or upwards for a length of 840 yards, having only 60 yards more to complete this work which we expect will be accomplished by the end of the present month. The contractors are making the necessary preparations for securing that portion of the old level included under contract No. 2, and are at present engaged in cutting the foundation to receive the brick arching. All the operations have been carried out in a satisfactory manner, and we are much pleased to be able to give so favourable a report upon the appearance of the vein, as developed by the workings in the Deep level since the last general meeting.

JOHN TAYLOR AND SONS.

DYNAMITE.

SIR,—This useful, and in my opinion the best, explosive for all kinds of work is subject to attacks from various quarters, and ostensibly by disinterested persons, but the object of most of these assaults is so obvious to any candid reader that they will be taken for what they are worth. An article that has contributed so largely to the successful execution of those gigantic undertakings on the Continent and many of less magnitude at home, where other explosives have practically failed, is not to be snuffed out of existence by the garbled statements of persons "in the trade."

Only in last week's *Mining Journal* a partial quotation is made from Nobel's advertisement, and reflections made on his veracity, which is both unfair and mischievous. He nowhere states that dynamite is "unaffected by damp," but that its "explosive properties" are not affected, and, unfortunately, several accidents show that it retains its violent explosive properties for an indefinite length of time. Having had considerable experience with it in all sorts of places, I may venture to suggest that the agent should insist on its being carefully handled, and strict conformity to the published instructions observed. Before use it should be well thawed, and if the cartridges were enveloped in a waterproof flexible covering it would prevent exudation, and be exploded in a dry state without the increased fumes consequent upon its being moistened with water. In shaft sinking, which is usually wet, only thoroughly reliable fuses should be used, and the firing be done by electricity; the danger then of unexploded cartridges will be reduced to a minimum, and next year's obituary of "accidental deaths" will not be materially swelled by the victims of dynamite.

J. B.

Rushen, Isle of Man, Sept. 17.

TREATMENT OF COPPER AND SILVER ORES.

SIR,—I have to thank you for your kind insertion of my letter in the *Journal* of July 20, and I now venture to intrude once more on your valuable space to answer your correspondent "C. E.'s" most fair and just letter published in the *Journal* of August 24. I can confirm most emphatically all I stated in my previous letter at being strictly correct and thoroughly practical, anyone reading is carefully cannot fail to see that what I offer is straightforward and business-like, the technical part up-setting several accepted chemical theories, and belonging to an unstudied branch of chemistry—the double decompositions which take place in an acid concentrated saline solution, cannot be discussed, except by those who have made experiments under my directions. "C. E.'s" suggestion that the process should be discussed in your columns can only be unreasonably accepted by such who will take the trouble to make practical experiments in accordance with my instructions, mere theory being worse than useless in this case. What your readers could easily do and with advantage, is to raise such objections as their practical experience may suggest to them, and I shall be most happy, with your permission, to answer them fully, and I feel sure also to their entire satisfaction. Four years study of the matter, experiments on over 2000 samples of ore, give me some authority on the subject, and with such a large experience it would indeed be a difficult and exceptional case which I could not answer.

I could have allowed the matter to rest, for everything is progressing as satisfactorily as I could wish; I have sold the French patent to a company who will probably begin working in November. I am expecting good news from the works started in Bolivia, and it will not be long before the works in Spain are in going order, but "C. E.'s" letter is of a kind which certainly deserves an answer at my hands, and it is with great pleasure that I will now proceed to meet the three main points raised by him.

1.—Pyrites incompletely roasted merely split up, certainly do yield the whole of their copper and silver when treated with my solution in accordance with my instructions. I can guarantee this, and am ready to prove it whenever called upon.—2. I can also guarantee, and am ready to prove at any time that chloride of silver is soluble in the cold in my solution, and that from any mineral, however complex, the whole of the silver present can be extracted by means of metallic iron my process directs that the liquor be completely saturated with the copper or silver, or both; the acid used is

thus saturated and over saturated, the liquor is no longer acid, hence only the exact equivalent of iron is dissolved for the quantity of copper precipitated. From this "C. E." will easily understand that my statement is correct, and that only 75 per cent. of metallic iron is really required. I hope that these explanations will be accepted as satisfactory, and that "C. E." will not hesitate to make any further questions or objections his experience may suggest to him, and should he wish it I shall be very happy to correspond direct with him.

Rue Beaumont, Paris, Sept. 17.

A. DROUIN.

MINING NEWS FROM UTAH.

SIR,—Alta City, in Little Cottonwood, is at present nearly built up again, and in a more substantial manner than it was before. The Emma has struck a vein of rich ore 6 in. to 3 ft. wide; the ore assays in the hundreds; 40 to 50 men are at work in the old workings, and on concentrating the low-grade ore; 16 men are at work on the new strike.

The Flagstaff works with 150 men, and ships 75 tons of ore daily. The Reed and Benson works 40 men, } Assay from \$100 to \$300
and ships 250 tons per month. } per ton.

The Toledo ships 250 tons per month. }
The North Star (neighbour of Emma) is working with a small force.

The Alta Consolidated (South Star and Vallejo situated between Flagstaff and North Star) has put up hoisting works, and ships good ore; they work with 30 men.

The Ophir (neighbour of Reed and Benson) has struck a rich vein of ore.

The Windsor group ships 30 tons per month.

The Frederick tunnel is over 1000 feet in.

The Gladiator tunnel is over 1600 feet in.

The Equitable tunnel will strike the main vein in a few months, and ships ore daily.

The Davenport works with 12 men, and ships 60 tons of ore per month.

The Lavinia works with 20 men, and ships 100 tons per month.

The Antelope and Prince of Wales 65 men, 250 tons per month.

The Richmond works with 14 men, and ships 30 tons per month.

In American Fork a rich strike of ore has been made on the Blue Bell Mine, west of, and in the same belts, the Rader, Lady Annie, La Belle, and Wackham Rhein Mines; the ore shipped as-yas \$200 to \$300 per ton, and the owners refused to sell the mine for \$16,000, which was quite right.

The Sunday has made several shipments of rich gold ore to Reno. Wild Dutchman pays both owners and lessees very well.

In Bingham, the S. E. boat, Stuart, Constitution, and Peabody ship gold ore, and have a fair prospect of rivaling the Ontario.

The Old Telegraph, Graceland Bend, Montana, and Jordan Mines are worked by a force of 150 men, shipping from 95 to 150 tons of carbonate ore per day.

The Last Chance is rapidly pumping out the water, and the shareholders may prepare themselves for good news as the mine is on a line with, and in the same belt as, the Steamboat, Stuart, Peabody, and Constitution Mines.

W. BREDEMAYER.

Salt Lake City, Sept. 5.

TREATMENT OF SILVER ORES IN NEW GRANADA.

The following letter has been addressed to Mr. George Green, of Aberrystwith, by order of the directors of the Tolima Mining Company:—

DEAR SIR,—I have much pleasure in informing you that this company have advised from their superintendent to the effect that the dressing machinery supplied by you is working admirably, and that the results show unqualified success. The foreman dresser lately sent out to work the machinery reports as follows:—

No. 8 Slime	...	Ozs.	467
6 Blende	...	...	153
5 Sulphur from jiggers	...	...	186
4 do.	...	...	330
1 do.	...	...	334
8 do.	...	...	646
7 do.	...	...	357

Our No. 8 slime and No. 6 blende were all formerly thrown away. The above results speak for themselves, and the great success your dressing machinery has attained in the treatment of our silver ores is the subject of equal congratulation both to yourself and to this company.

WM. W. HOLMES, Secretary.

Tolima Mining Company, Finsbury circus, Aug. 28.

ECLIPSE GOLD MINING AND QUARTZ CRUSHING COMPANY.

SIR,—I was unable to be present at the meeting held last Wednesday, presided over by Mr. C. S. Nelson. I am not surprised at anything this gentleman may say, either in favour of himself or his friend Mr. Hubert, from whose house he dates his circulars. I think it will be a sufficient guarantee that the directors did their best for the company when you are informed of the large sums they have sunk therein. My loss in shares and bonds is 1200l., Mr. Wilde, one of my colleagues, I believe about 1000l.—Mr. Hubert a very large sum. My family about 1500l.; Mr. Willett, who was also a director, and his family a considerable amount. Being away from home, and writing from memory, not having papers at hand, I cannot state the exact amounts. It is not likely with so much at stake we should have allowed the company to be wound-up if there had been much chance of success. It became impossible to control the expenditure, and Mr. Nelson was as much to blame in that particular as anyone. You may judge when Mr. Rickard wrote home saying that Mr. Nelson was keeping a buggy and four horses at the company's expense. As to any direct efforts to buy or lease the mine are entirely contrary to fact. The directors would have been too pleased to have met with a bona fide purchaser. As you are aware, the shareholders were called together to decide whether the company should be carried on, when they were truthfully told the state of affairs. I believed it was decided without a dissentient that the company should be wound-up. There was not one willing to advance a shilling more. From the time Mr. Nelson went out I am not aware of a single assay having been made by him, although he was engaged as assayer and accountant. I should take up too much of your space to refute categorically Mr. Nelson's assertions, but I hope if another meeting should be called to be present, and bring proof in most instances how utterly at variance with the truth Mr. Nelson's statements are. The shareholders and all connected with the company were made aware from the commencement of the difficulty in obtaining the patent, and throughout the existence of the company they were informed of the progress made; indeed, at all times every information the directors possessed was at the service of the shareholders. R. M. PORTS (late Chairman).

Hillside, The Avenue, Beckenham.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—We read in the Times last week of a mine in Colorado that had been manipulated by its manager in order that it should be unremunerative to its shareholders, and so disgusted them that its shares were picked up by the manager for a song, and that the mine in question is now yielding the manager a handsome return. This is one out of the many difficulties connected with owning a mine situated beyond the control of shareholders. Much has been written and said to the prejudice of the Richmond committee, none of whom have come forward to defend the conduct of Mr. Brereton, who sold his shares, and then published that which was calculated to seriously injure the property, inasmuch as it showed clearly the precarious hold that the shareholders had on the mine. It is ever before my mind that a year ago the mine was dividendless, closed, explorations discontinued, and the mine said to be worked out. It was coincident with the appointment of the committee that Mr. Probert caused explorations to be continued in the very ground in which, upon taking over the management a few months before from

Mr. Rickard, he ordered explorations to cease, and that consequent thereon the mine had paid good dividends. I feel that we are indebted to the committee that insolvency did not then overtake the company; but what will happen now that there is no committee to watch our interests is the question? Under these circumstances I submit that, without a change of management, and without getting rid of those directors who backed up the manager, I think it would be unadvisable to relieve the "ring" of one of their shares. I am advised, on reliable authority, that these speculators who are so industriously "bailing" the shares cannot pay for those which they have bought, and that they are paying at the annual rate of 24 per cent. to be allowed to carry over their purchases at the settlement on the Stock Exchange. The claim of the Eureka Company on us is 500,000l.

SHAREHOLDER.

THE RICHMOND MINE.

SIR,—Allow me to express my astonishment at the letter of Col. Stuart in last week's *Journal*, in which he commences by stating that my assertions are "false and libellous," and then goes on and proves absolutely the truth of all the facts I stated in my letter in the *Journal* of Aug. 31. The statements I made were that whilst he—Col. Stuart—was in America, to which country he had been sent at a great expense in the service of the Richmond shareholders, he took advantage of his position to apply for and was accepted as manager of another English mining company in Utah. This he avows to be "false and libellous," and immediately proceeds to rectify it by saying he only applied for a position as superintendent for sinking a shaft in that country. There is a subtlety of distinction in this contradiction which defies my power of analysis, but I fancy the shareholders will know how to deal with the matter when it is brought before their notice, and that they will decide as to whether Col. Stuart and his coadjutors have given them—

FAIR PLAY.

FLAGSTAFF MINING COMPANY.

SIR,—From what little I have been able to gather respecting the recent action taken by certain debenture holders of the Flagstaff Company I am scarcely able to form a positive opinion as to the best course to pursue, but one thing I think is clear—that if Mr. Snell (the company's late solicitor) had been listened to, as he deserved to be, both share and debenture holders would be able to realise to themselves a far better position than they are in to-day. As far as I can perceive the matter stands thus:—Billing, through the pernicious effects of the Helen Tarbet suit, has been enabled to take, and has taken, possession of the company's (debenture holder's) property which he is working under the name of the "Virginia" Mine. Secondly, Billing, outside of his hold upon the so-called Virginia claim is not worth proceeding against by legal process.

On the other hand, if Mr. Billing were to make good his claim to the company's property he would be at once a wealthy man, or, at least, a responsible man. Mr. Billing now owes Mr. Pearson (who is the sole trustee of the debenture holders) nearly 5000l., including interest. Could irony or farce go farther than to have Mr. Pearson seriously occupying the post of trustee under such circumstances? A reversal of the Helen Tarbet decision by the United States Supreme Court would return the property to the company, break Mr. Billing's hold upon his "Virginia" location, and leave him unable to pay Mr. Pearson's large claim, or perhaps any part of it.

In the light of these facts, can it be matter of surprise that Mr. Pearson was found in Court during the present week opposing by counsel every suggestion and step put forward for bringing on the Tarbet appeal before the Supreme Court at Washington? Can Mr. Pearson possibly do his duty as trustee to the debenture holders, and also to himself, the two interests being directly in opposition? True, Mr. Pearson is, as I understand, both a share and debenture holder of the company, but his combined holding is but a bagatelle when placed by the side of what Billing owes him. It was certainly ill and injudiciously bestowed magnanimity on the part of Prof. Vincent, in his recent proceedings for the removal of Harvey and Pearson as trustees, to accede to an arrangement in Chambers by which Mr. Pearson was allowed to hold his seat as a trustee for the debenture holders when he could have been so easily disposed of? Mr. Snell, however, with deeper experience and foresight in such matters, specially sought and obtained from the Master of the Rolls power and privilege for himself personally to move the Court for the ejectment of Mr. Pearson from his seat as trustee in case he should see fit to do so. If Mr. Snell now does not "see fit" to do so I for one shall be considerably disappointed. In the meantime let a meeting of the debenture holders be called and trustees elected who can consistently do the duties of the office to which they are appointed; certainly the sooner this is done the better.

A DEBENTURE-HOLDER.

COLORADO UNITED MINING COMPANY.

SIR,—In the Supplement to the *Mining Journal* of Aug. 3, page 859, is contained the report of Sir Cecil Beadon, the Chairman, to the shareholders of the Colorado United Mining Company at the annual meeting, in which several statements occur with regard to myself that necessitate a reply from me, both in justice to myself and to the shareholders of that company. I was appointed agent and manager of the Colorado United Mining Company in 1875, and took charge of the mine on March 31, 1875. In the agreement between the company and myself it was stipulated that "the appointment of all subordinates on the permanent staff at the mine rests with the board," so I had no power to remove or appoint any of them. Until July, 1877, all accounts had been punctually forwarded, except those of April and May; at that time the secretary of the company—Mr. Andrews—discharged my clerk, A. H. Stockdale, a faithful servant of the company for over three years; instituted a new way of keeping the accounts, and appointed an inexperienced man in his place, against which I protested to the directors in a letter dated August 27, 1877, of which they took no notice. On Nov. 28, 1877, the gentleman appointed by Mr. Hamill to assist in getting up the back accounts, and the present accountant of the company, wrote to Mr. Andrews as follows:—"Enclosed please find accounts for the term required to fill the series of reports, and closes the accounts of G. M. Henty, manager, which we hope will be found correct and satisfactory. The past trouble with the books of the Terrible Company since March 31 was caused by a system of book-keeping inaugurated by Mr. Andrews while here, and is entirely foreign to any of the established systems." And on Jan. 26, 1878, Mr. Stockdale, being in London, was requested to attend a board meeting held on Jan. 23, which meeting he did attend, and his explanation with regard to why the April and May accounts were delayed was satisfactorily received by the board. At the time of Mr. Stockdale's removal (July, 1877) I was instructed by Mr. Andrews to consult Mr. Hamill on all matters, and that Mr. Hamill was to countersign all cheques, buy all materials, and dispose of all ore. On July 6, 1877, in an official letter from the company, they replied—"The board gave due consideration to the contents of your special letter of Aug. 3, and with reference to your resignation. The board regrets to learn that you are determined to leave the company. The board accepts your resignation, and will be prepared to relieve you of your trust on March 31, 1878." On Jan. 3, 1878, Mr. Andrews arrived here and gave me a letter of immediate discharge, under date of Dec. 8, 1877, at the same time giving me a copy of his full letter of instructions (both signed by Sir Cecil Beadon), in which occurs—"It will be your duty to inform the board if the operations inside the mine have been conducted by Mr. Henty, in conjunction and with the approval of Mr. Hamill." How does this tally with Sir Cecil's thanks to Mr. Hamill for "stepping forward and taking charge of the mine when six months before I had been specially and officially instructed to work under his supervision, which caused me to resign, and these instructions prove

that Sir Cecil knew it, and understood that it was under Mr. Hamill? Early in December Mr. Hamill cabled to the board not to make any arrangements for my successor, which cablegram Mr. Andrews acknowledged he had received before leaving England. I could hardly then have "shown signs of incapacity for attending to business" in Mr. Hamill's eyes, nor could he have seen the "infirmity" to which Sir Cecil alludes, and which I should be glad for him to so clearly explain that I as well as others may understand what Sir Cecil means. On January 31, 1878, by the plan of the mine I showed Mr. Andrews about \$90,000 of reserves opened up. In the Colorado Miner of June 8, 1878, published here, in a three column article about the Colorado United Mining Company, the writer, St. George Stanley, says—"In company with Mr. Cecil C. Morgan, the present efficient superintendent, representing the English interest of this company, I made my way to the entrance of the Union Tunnel. Descending 60 feet with foreman Slockett and Mr. Morgan we reached the sixth level, &c. Sixty feet further we reached level No. 7. All the way back from the Terrible shaft I found that the ground had been stope out, with the exception of a block 140 feet in length above, since the advent of the new superintendent." Sir Cecil and the new superintendent can doubtless inform the shareholders where this ore has gone.—*Georgetown, Colorado, Aug. 31.* GEORGE M. HENTY.

THE ENGLISH LEAD TRADE.

SIR.—The import of lead ore from foreign countries into the United Kingdom for the month of July last is the largest of any month in the present year, and no doubt had the effect of arresting the upward tendency in prices for both ore and metal observable in the preceding month. The slackness of trade generally has also injuriously affected our exports, but it is, nevertheless, somewhat satisfactory to note that the Board of Trade Returns for July ceased to exhibit that continued falling off with which we have for some time been familiar, as we find for that period there was an increase in our exports of the manufactured descriptions, if not in the crude metal. It may also be inferred that as the imports of ore for August fell off some 60,000 tons, the accumulated product from the mines of Spain during the civil war has at length been brought to market, and that, consequently, when it shall have been to some extent absorbed in manufactures and commerce, a return to normal values for the commodity may reasonably be looked for.

It will, however, be conceded that lead mines most certain to yield profits at times like the present are those capable of producing largely at relatively small cost, and it is to illustrate how much this has been and still is the cause of success in many Cardiganshire mines that I have endeavoured to place before your readers facts connected with, amongst others, those worked by the Lisburne Company, as affording undeniable evidence that they possess the requisite qualifications for obtaining such a result. Resuming, therefore, a retrospective view of the progress made by the Lisburne Mines, and the dividends paid during a period when the market values for lead ores ruled as low as at any known period, it appears that for the ten years ending 1847 the prices for lead ore ranged between 9s. 10s. and 11s. 10s. per ton, and that for such period the dividends paid to shareholders exceeded by far the entire amount of the subscribed capital. For the next ten years it would seem that ore took a wider difference in value, the figures representing 9s. 3s. and 15s. 10s., but for this period the profits divided were not less than 80,000s., and as a season of high values seems at this time to have set in, the next decade gave a similar return in the way of profits.

It is recorded that of the mines contributing to such splendid results Froncoch has given no less than 24,000 tons of lead ore since 1855; Glogfach is credited with 9172 tons; Glogfawr with 2700 tons. There are besides sundry returns from some of these which have been included under the head "Lisburne Mines," but the exact proportion of which to each mine does not appear in the official list of ore sales, and are not, therefore, taken note of in the figures now given. Another famous contributor to the aggregate yield during the past twenty years or so has been East Logyls, which from the mining records quoted gave the important quota of 12,000 tons of ore, and these do not by any means represent the entire produce of the district for the period named; they may, however, convey some idea of the magnitude of the lead deposits of Cardiganshire, and especially of a locality which is now, from the many and unusual facilities possessed by it, likely to attract an increased amount of attention from those who are seeking really sound investment in profitable lead mining.

As it seems probable from notifications which have appeared in your columns that one or more of the great lodes traversing the district to which I have alluded are to be extensively worked with vigour by means of ample capital under the direction of practical and experienced control, I venture to express a hope that the mines will be developed with that energy and skill they so well deserve, and that the resources they are known to possess thoroughly made available, as there is little doubt but that up to the present time the system pursued in working only shallow levels has been a serious error in judgment, and that but for the exceptionally rich deposits the profits realised would not in many instances have been secured. On the other hand, should the proper course be in future followed, and a sufficient amount of capital expended in sinking and driving, a large amount of success is certain to be met with.

Bishopsgate-street Within, Sept. 19.

JOHN OWEN.

MINERALS AND METALS—MINERS, SMELTERS, MERCHANTS, AND CARRIERS.

SIR.—From the statistics published in your valuable Journal of Sept. 14 I gather that 16,692,802 tons of iron ore were the product of the year 1877, valued to the miner at about 7s. 6d. per ton, or in the gross 6,746,668s. The metal contained in the ores was it will be found 6,608,664 tons, estimated to average 2s. 9s. per ton. The average price of Scotch pig for the year was 2s. 14s. 4d., the price now is 2s. 7s. 11d. a ton, or (say) 8s. per cent. below the lowest quotation of the year 1877—2s. 12s. per ton. The average produce of the ores to the miner was 37s. per cent., valued at 7s. 6d., the metal refined averaged 2s. 14s. 4d. Thus fuel, coal, labour, and profits to smelters and merchants absorbed 9,444,568s. out of the gross estimated value of the metal—16,191,236s. The great importance of this industry can thus be somewhat estimated by your general readers when you understand that the miners received 6,746,668s. Smelters and merchants 9,444,568s., while probably marine and rail locomotion in the varied transmission of raw and manufactured iron a sum equal at least to that obtained by both miners, smelters, merchants, and labourers in the production and reduction of the ores into metal. Hence the first cost of the product to consumers is raised to about thirty-two and a quarter millions.

In the year 1872 the value of tin ore was 87l. 7s. a ton, and of metal 152l. 15s. Four years later the prices were respectively 43l. 18s. and 79l. 10s. 2d. a ton. Last year the price of tin ore averaged to the miner 40l. 10s., and the metal 73l. 3s. 6d. The quotations at present are 30l. a ton to the miner for his ore, and of 57l. a ton for Straits and Australian metal. Thus the price to the miner is just 26s. per cent. of that obtained in the year 1872, while the metal has fallen no less than 74 per cent. in the interim, or (say) 95l. 15s. a ton, or about 165 per cent. of existing market value. We need no comment on these figures to picture the distress and difficulties attending tin mining in Cornwall. It is true that there are mines still paying dividends, and the resources of the county are augmented as the workings attain depth, while the introduction of machinery, improved dressing, and all but universal economy, coupled with indomitable energy and perseverance, have mastered to some extent the revolution enforced upon mines and mining. We, therefore, hail as a harbinger of future successes the announcement of a dividend from South Frances, and the continuance of them at Eliza, South Condurrow, Wheal Pavor and Dolcoath, the veterans of a century's growth.

The product of lead ores for the year 1877 was 80,850 tons, from 347 mines, and the metal yielded amounted to 61,403 tons. The average price of this metal for the year 1877 was 20l. 11s. 3d. a ton. The present quotation is 16l. 7s. 6d. a ton, or over 20 per cent. drop

in value. This to the miner, in case the product is the same for the present as the past year, is equal to 257,125s. The cost of labour and materials being the same this sum is diminished profits, and seriously affects adversely all large producing mines, as, for example, Leadhills, Roman Gravel, Tankerville, Van, Lisburne, Grogwinion, Minera, Great Lavey, West Chiverton, Pant-y-mwyn, East Pant-du, and the prize of the year, Pateley Bridge. The price of the shares in the latter is marvellously low, with a lode in the deepest level penetrating virgin ground, with 90 fms. backs, yielding for months 8 to 10 tons of lead ore per fathom, with the fore-breast still good; sells at 5s. a share, or (say) just 20,000l. for the entirety. This mine was introduced by us about two years ago, and the present company was formed under the auspices of Mr. George Batters, who practically introduced the West Chiverton, the Van, the Pateley Bridge, and more recently the Hultafall in Sweden. All of these mines possessed the germs of success at starting, and while the two first have proved the best lead prizes upon the tapis for the last fifteen years, there is no doubt that the Pateley Bridge and Hultafall will become compeers of signal importance. Among the progressive mines now favourably open to selection we would call the attention of capitalists to the Lead-Era Mine. This property is not over-loaded with vendors' purchase money or executive charges, while the reports of Capt. Roberts, of East Pant Du, Capt. J. A. Ede, of Nant, and Capt. Peter Dykins, of the Jamaica Mines, all tend to establish the inherent value of the company's property, and the economy with which it can be developed. We shall again refer to the valuable statistics published by you, but suffice for the present.

R. TREDINNICK,
Dealer in Stocks and Shares.
Exchange, 66, Coleman-street, London, Sept. 16.

PATELEY BRIDGE LEAD MINES AND SMELTING COMPANY.

SIR.—A few months ago with your kind permission I drew attention to the value of these mines. Since then I have been from the district, and on my return was much pleased but not surprised to find that our grand old mine—the Cockhill—has again come to the front, as the most productive property in this well-known mineral belt. Much has been said from time to time as to its resources, but withal little is known of what, judging from the upper workings, the near future is likely to be. The valuable discovery which I find has been met with 30 fms. below horse level is only one of many points which I believe would be quite as rich if the mines were developed upon a scale they so well deserve.

I cannot understand why with all the knowledge of what these mines have hitherto done operations should be so curtailed. As an old miner, I would strongly urge the shareholders not to lose more time in opening other valuable veins now that they have proved, beyond all doubt, what the veins yield at a depth hitherto unworked in Greenhow Hill, although known to be rich in the neighbouring Duke of Devonshire's Grassington Mines.

Sept. 18.

PROFITABLE TREATMENT OF MUNDIC.

SIR.—As an old shareholder in mines I have frequently noticed that the mine captains constantly refer to lodes producing mundic, and by the disreputable way in which they speak of it I suppose it cannot be profitably worked. What I would, therefore, ask is—whether the process of separating the mundic from the matrix in which it is embedded is an expensive one? I opine not, because in some concerns I am acquainted with the sale of that mineral at 1s. per ton has left good profit. At present, owing to the great depression I suppose, the value of mundic has gone down with that of copper. But I will suppose that the cleaned mundic costs the adventurers 15s. per ton. I know that the percentage of sulphur in pyrites varies considerably, but I think 48 per cent. would not be too high to take as an average. I will refer to these figures again when I have noticed the invention which has caused me to think of them.

I need, perhaps, scarcely explain that iron pyrites is a bisulphide of iron—that is, it consists of two equivalents of sulphur and one of iron (copper pyrites is somewhat similar, but its composition need not for the moment be considered), and Mr. John Hollway, of London, has now patented a mode of treatment by which he gets out one equivalent of the sulphur as sulphur, and utilises, when it is impracticable to extract it as sulphur, the other equivalent in the form of sulphuretted hydrogen for precipitating sulphide of copper from cupreous solutions. It will, perhaps, be best to give an account of the process in his own words. As an example of the mode in which I operate I fill, or partially fill, with pyrites a retort, chamber, or other vessel set in a furnace, and after heating it to dull redness I introduce, or drive through the pyrites, a current of superheated steam. I then raise the temperature of the vessel, and I find that the steam carries over in suspension about one equivalent—that is, about one-half of the sulphur originally combined with the iron in the pyrites. A stream of sulphuretted hydrogen is evolved, which continues until the end of the operation. I then find that the whole or part of the sulphur has been obtained from the pyrites as crude sulphur, and in the state of sulphuretted hydrogen, the relative proportions and the quantities varying according to the temperature and the length of the operation. In preference I employ a temperature of about 1500° Fahrenheit, because I then obtain a large yield of free crude sulphur, and by still further increasing the temperature of the operation I obtain the major part of the sulphur originally combined with the iron in the pyrites as free crude sulphur, and hydrogen is evolved, which I burn as fuel, or otherwise utilise.

When cupreous iron pyrites is thus treated, and when at the end of the operation hydrogen and sulphuretted hydrogen almost cease to be given off, the residue consists principally of oxide of iron and sulphide of copper, from which the copper can be extracted, and the oxide of iron afterwards utilised. By thus treating at a temperature of 1400° Fahrenheit cupreous iron pyrites containing 47.96 per cent. of sulphur I obtained about 23.7 per cent. of crude free sulphur—that is, practically one-half of the sulphur originally combined with the iron in the pyrites, nearly the whole of the remainder of the sulphur being evolved as sulphuretted hydrogen. When pyrites is poor in copper I distil off, as before described, the greater part of one equivalent of the sulphur. I then either utilise the residue as hereinafter explained, or I expose the said residue to the action of air and moisture, whereby sulphate of copper will be formed, and from which the metallic copper can be obtained by any of the well-known means.

The mode of treating the pyrites may be modified. For example, in lieu of heating the retort, chamber, or other vessel externally the steam may be introduced at a sufficiently high temperature to expel the sulphur without the assistance of external heat; or when sufficient external heat is employed to fuse and keep the sulphides and oxides molten the superheated steam can be driven through them in somewhat the same manner that air is driven through molten crude iron in the Bessemer operation. I preferably pass the vapours through one or more chambers, so as to allow the metallic and other substances to deposit therein before separating the sulphur from the vapours. When I require to produce sulphur practically free from arsenic I digest the crude sulphur with a dilute solution of alkali or alkaline sulphide (preferably cold), and thus render the sulphide of arsenic soluble, so that by decantation or filtration it can be removed.

Now I have given 48 per cent. of sulphur as the average in pyrites, and Mr. Hollway shows that from ore of this produce he obtained 23s. per cent. of sulphur as crude sulphur. I will assume that the whole of the value of the 3s. per cent. is required for the cost of carrying on the process, so that only 20 per cent. would remain for the mine adventurers. I have not discussed the matter with Mr. Hollway, but I believe he does not estimate that the cost of his process would be as much; my object, however, is not to overstate the importance of the invention, so that I take it at 20 per cent. of crude sulphur from the mundic treated. This would make it that 5 tons of mundic would yield to the adventurers 1 ton of crude sulphur. If, then, I am correct in assuming as I have done that clean 48 per cent. mundic could be supplied to Mr. Hollway at a cost of 15s. per ton, it follows that the prime cost of 1 ton of crude sulphur would be 3l. 15s., whilst 5l. 5s. would be the lowest price of such sulphur

at the present time. From this deduct 10s. per ton for cost of getting the sulphur to market, and there would still remain 1s. profit, so that if Mr. Hollway arranged to erect the necessary plant at mundic-producing mines and divide profits, after charging 20 per cent. thereof for wear and tear and interest on capital, there would be 8s. for the mine adventurers and 8s. for Mr. Hollway and his friends out of every ton treated. Surely this should be a sufficient inducement to capitalists.—*Redruth, Sept. 10.* H. THOMAS.

LEAD MINING IN FLINTSHIRE, NORTH WALES.

SIR.—Having this week visited several of the lead mines in this district, which are not usually subject to the process of "writing up," but at the same time are quietly being brought into a prominent position, I thought a few remarks thereon might, possibly, be acceptable to many of the readers of your valuable Journal.

At the RHYD ALUN MINE, Rhydymwyn, near Mold, I was agreeably surprised to see the rich piles of lead being brought to the light of day. They have there 25 tons (the produce of last month's working) in the ore bin; and, although only a week had elapsed from the day of the Holywell lead sale to the day of my visit, I estimate there were quite 15 tons of lead lying on the bank towards the next month's sampling, the principal part of which were large lumps of pure galena. I am informed that they have driven through about 20 yards of very rich ground during the last six weeks, portions of which have been valued at 8 tons of lead per fathom. The manager deserves the highest praise for the way in which he has stuck to this mine, many fathoms having been driven through hard lime rock, with only the faintest indication of an east and west vein. I should have said that the workings are confined to the driving of an adit, or day level, and stopping the roof; consequently the profits on the present yield of ore must be something handsome. The vein is a true east and west one, running between and parallel with the veins of the celebrated old Llyn-y-Pandy and Pant-y-Mwyn Mines, and I venture to predict that as the workings are continued further east the lode will yet be found more productive.

The next mine I wish to call attention to is THE VICTOR, immediately adjoining Rhyd Alun on the north. Here they are sinking their engine-shaft below the 110 yard level, on a very large and promising north and south vein; very rich bunches of ore have been found in shallower levels, and I am informed that a good deposit of ore now exists in the sole of the 110 yard level, and which will shortly be drained by a drift from the bottom of the engine-shaft. A still more important feature in this mine is the intersection of the Bryn Celyn and Coed Du east and west veins, for which purpose the 110 yard level is being driven north. I believe this level will reach these lodes about 50 yards below the old workings, and from my knowledge of the enormous yield of lead from them in the mines named, I predict a great future for the Victor Mine.

On Halkyn Mountain mining generally appears dull, with one or two exceptions. Prince Patrick is being worked vigorously, and from the nature of the stuff I saw winding out of the mine—a good mixture of galena, with green oxide of copper—I should say they must be very near to another large deposit of lead, similar to the one which made this mine so famous some years since. I saw a nice pile of lead ore in the bin ready for market.

If I have not already trespassed too much on your columns I may, with your permission, at an early date again refer to the subject of mining in this important district.

Sept. 18.

MINING ENGINEER.

LEAD MINING IN FLINTSHIRE.

SIR.—In resuming the brief notice of the above, which appeared in the *Min. J.* of the 7th instant, it becomes somewhat interesting to notice the special features of promise connected with the Nannarch Lead Mining Company, who appear to possess within the area of their grant the Pant-y-ne lodes, which appear to intersect both the old Rake and the celebrated Pant-y-go, the last of which named lodes produced a clear yearly income of 180,000l. for upwards of 20 years. By information just received it would appear that the operations of the company have been rewarded with a discovery of a course of ore 10 inches in width at a depth of 25 fathoms from the surface.

PLUMBER.

MORFA DU MINE.

SIR.—A mine cutting 10 to 12 tons of zinc ore per fathom, as in this property, having gold and silver capable of extraction, and with a capital (issued) of about 7500l., ought to rise to a large premium, situated in such a renowned district as Parys Mountain. There is also the great white rock to be perforated, which is similar to Parys conformation, and no doubt will prove equally wealthy as its historical sister-mine in copper ore. I am looking with great interest for the first sale of zinc ore in this mine; as it is unusually rich and solid this lode can be quickly brought to surface. I should imagine that smelters would purchase this rich ore without further preparation. If gold in paying quantities is to be found the ore ought to fetch a high price indeed. The large feeder of water issuing from the lode indicates, in my opinion, that an exceedingly large body of mineral will be developed. If gold and silver are to be found, as anticipated, the shares must become very valuable. I should also judge, from the well-known locality, that a large course of enormously rich copper ore was at hand.—*Sept. 18.*

MINER.

THE LLANRWST LEAD MINE.

SIR.—The North Wales Correspondent of the *Mining Journal* in his letter of last week, remarking on the above mine and myself, appears to put himself in a paradoxical position when he says "without interfering in the correspondence between Mr. R. Knapp and 'Engineer' he does interfere by stating 'it would be very interesting to many persons interested in the Llanrwst Mine if Mr. Knapp would describe the parts of the mine from whence 100 tons per month could be derived.' Why describe the places, seeing that correspondent knows nothing of the mine, and my not being a good descriptive writer would it not suffice if I were to name them? A descriptive writer might not only be uninteresting but wholly unnecessary to many of your readers, especially in view of the fact that they are merely of the ordinary kind, characterised by no peculiarity. He states—"The mine at its birth was certainly invested with a halo of promises." If we look at the mine itself it undoubtedly was but promises; other than those, if he alludes to me, resolve themselves into statements. I made no distinct promise, but honestly stated my opinion of the mine from facts either indicated or ocularily demonstrated. I answered something akin to your correspondent's suggestion query in my reply to "Engineer" in the *Mining Journal* two weeks since, but that does not seem to satisfy your North Wales Correspondent, who does not appear inclined to tolerate extenuating circumstances even from the altered condition of external realities, but, Shylock like, demands the pound of flesh in literal form. I stated in my reply to "Engineer" on this subject that the depressed condition of the lead market had materially tended to a decrease of the returns from this mine. I expressly pointed to the difference in the price of lead at the time to which he referred and at the present time, and stated that the difference was greater than the amount of profit we expected to realise on the working of a great deal of our ground, so that at the present time the same ground could only be worked at a loss to the company.

The parts of the mine from which I expected, and still expect, the returns to be made are—the 10 above adit, the adit and the 14 fms. level below the adit, and from still deeper levels on the caunter lode, aided by considerable returns which I expected, and still expect, will be made from the main or old lode, where we have a length of ore ground for 60 fathoms extending from near the caunter lode, the mine as far east as a cross-course where about 20 fathoms main lodes are in junction, abutting a cross-course about 9 fms. under east of diagonal shaft, which shaft has been sunk about 9 fms. under the adit reaching water; at this point the lode is fully 6 feet wide in the shaft, and will produce from 2 to 3 tons of lead ore per fm. It is by sinking this shaft, and making available the resources therefrom, in conjunction with the other parts of the mine already referred to on the caunter lode, that my estimate of the returns from

the mine was made, and although in common with many others we have met with a set back from the serious drop in the price of lead I retain unaltered my conviction of its value and prolific character. I think your correspondent might find a more instructive theme for his pen than that of twitting men who are as earnest and honest as himself in their endeavours to sustain and promote legitimate mining. If the gentleman could show that the best which could be done is not being done I will freely lay myself open to his severest criticism. But if he can do nothing to improve matters why should he trouble himself to inflict annoyance. The difficulties which beset mining at this onerous and critical period are sufficiently embarrassing to mine agents without being called upon to answer gratuitous interrogatories by irresponsible anonymous writers.

Llanrwst, Sept. 17.

ROBERT KNAPP.

PANT-Y-MWYN LEAD MINING COMPANY.

SIR,—In last week's Journal I notice some remarks from Messrs. Watson Brothers in reference to the above mine, which if left uncontradicted may be misleading. All persons wishing to inspect the mine in question must have an order from the secretary. Messrs. Watson Brothers are incorrectly informed that the water is drawn from the workings below the water level by a hand-pump. Pumps worked by efficient steam machinery are used. Why they (Messrs. Watson Brothers) should with their experience of mining operations make such a statement in a public Journal without first verifying it (which was so very easy) your readers must be the judges.

Liverpool, Sept. 18.

E. CARVER, Secretary.

PANT-Y-MWYN MINE.

SIR,—I observe by a report made on this mine, on August 9, that at that date the company had 100 tons or more of lead in stock. I visited the mine on Sept. 11 and found there was at least 170 tons of ore in the bin, ready for sale, independent of about 60 tons more lying on the dressing floors in course of preparation for market. Capt. Hughes informed me he had sold 12 tons of lead at £12 per ton a few days before my visit, and during the time I remained at Mold (about four days) a further 25 tons were sold at £15 per ton, and he was negotiating the sale of another parcel at a still higher price. The dressing floors are very extensive, unique, and perfect in every detail. The machinery is in splendid working order, and I should say it could prepare some 300 tons monthly. The mine itself was looking splendid throughout. Ore was being found in large quantities in every point of operation, and on account of its purity it is sold as potter's lead, which accounts for the high price it fetches in the market.

I learned that the yield is more abundant in proportion to the depth attained, and the reserves already discovered are estimated at 20,000 tons. The engine for draining the mine is adequate for every present emergency, and the water is conveyed by launders to the dressing floors, where it is utilized for dressing purposes.

At the Modlyn shaft they are sinking rapidly below the day level, and from present indications are in close proximity to the rich lode known to exist here, and in anticipation of large returns of ore from this section of the mine preparations are being made for the erection of another engine. The operations both above ground and below are conducted with the greatest skill, energy, and economy. "Honour be to him to whom honour is due," and if success be the index of merit, Capt. Thomas Hughes, the present manager, merits that honour, inasmuch as when he took the management of the property, about two years ago, there was little or no ore in sight, and he has, through his superior skill and practical knowledge of the geological formation of the district, brought this mine into a position that will compete with any lead mine in the Principality. I would not trouble you to insert this letter were it not out of a feeling of justice and fair play, having observed in some of your recent numbers inuendos reflecting unfavourably on the soundness and bona fides of this undertaking by parties whom I can only imagine know little or nothing of the property, but, as is often the case, when any genuine success is achieved a certain amount of jealousy is created, which exhibits itself in rancorous antagonism, but which in the end is only productive of good to its object. All I would wish is for all unbelievers in the merits of this property to verify the foregoing statements by a personal inspection of the mine.

Sept. 18.

JUSTICE.

YNYS MINE.

SIR,—Will you permit me, as agent for the above mine, to say, in answer to the observations of your valued Correspondent for this district, that the above mine is not the Pwll Romans Mine. That the discovery referred to is on a north and south lode, but in an entirely new place, to the north of any of the old workings, and in a splendid stratum of ground. With regard to your Correspondent's observations on north and south lodes generally I think they have never fairly been tested in this country. I have seen some very fine courses of ore on a north and south lode at Tan-yr-Allt Mine, not far from us, worth at least 3 tons per fathom, is now to be seen. I think these north and south lodes are always productive where they are crossed by east and west lodes, and at the new place at Ynys we have two north and south lodes coming together at a very slight angle, and these again are crossed by no less than three east and west lodes within a distance of 50 fms. Taking this into consideration, together with the favourable nature of the rock, the settled conformation of the ground, and the width and richness of the lode as seen, I think, with all deference to your valued and impartial correspondent, we are likely to have a good and lasting mine; nothing is a certainty in mining we know. The mine is private property, and the proprietor intends to work it himself. I should not have trespassed on your space had not your Correspondent seemed to doubt the richness and stability of the lode.

Tren-dol, Sept. 19.

P. WILLIAMS.

THE MINERAL RESOURCES OF CORNWALL, AND ITS UNWROUGHT MINING GROUND.

SIR,—I have long advocated the working of new or unwrought mining ground, not only as being the least expensive, less risky, and safest medium of investment, but that no enterprise pays like that of a rich mine; and that Cornwall yet abounds in wealth of copper, tin, and lead may be inferred from the fact of there being many sections of valuable untried mineral ground lying parallel and adjacent to the most productive mines ever wrought, having lodes showing strong evidence at surface of mineral below, the operation of the miner on a small scale only being required, I believe, to discover treasures of great wealth. In the Gwennap district—which has been, and still is to be, the richest copper-producing district of the county—the Carn Marth granite hill, forced up by volcanic power, and forming veins in which are found most abundantly metallic deposits, chiefly copper, is the centre of the great mineral hot-bed. It is around such upheaves that by far the larger portion of the mineral wealth of Cornwall occurs, at the foot of which may be seen cropping out at surface elvans of a highly crystalline character, in close connection with copper lodes, the surface outcrops of which show unmistakable evidences of copper deposits being found at shallow depths—such, for instance, as the outcrop of the United Mines lode, in Gwennap, which was found and sunk on by a working miner, and at a depth of 20 fms. he earned 1000*l.* odd as his tribute part of the copper ore raised in four months. This led to more extended operations, the result being that the proprietors reaped a profit of something like 500,000*l.*

Another instance is that of Wheal Unity, at the foot of the same upheave, where two tributaries sunk a trial pit of the outcrop, and made a discovery 10 fathoms from the surface, which led to such influential positions and wealth. Again, Tresavean and Penstruthal, sinking on the surface outcrop, led to the division of profits, in one year of 125,000*l.*; while the Great Consols, a little further east, raised and sold in 18 years 1,845,000*l.* worth of copper ore, giving a clear profit to the proprietors of 320,000*l.*, besides accumulating a plant valued at 90,000*l.*, and paying the lords as dues 76,882*l.*; but it must be understood that surface outcrops producing such results are those which throw off the true copper gossan, known only to the experienced eye, the great mistake being by so-called practicals

calling every back of a lode containing ferruginous matter copper gossan, hence the failure of many undertakings. The writer will be pleased to point out a section of unexplored ground at the foot of this great upheave, having lodes showing gossan outcrops such as have never been known to fail producing copper ore in paying quantities when sunk on; indeed, the same lodes to the east have given profits amounting to over one million sterling. Yet such is the apathy displayed by the public that many such properties are lying idle for want of a few to co-operate in the promotion of an enterprise possessing all the elements of a great success, this opinion being justified by analogy, to which practical mining authorities will ever attach great importance, having proved to be the safest guide in forming their opinions of the inherent value of mineral properties.—Cornwall, Sept. 19.

CHAS. BAWDEN.

SOUTH DE ERESBY LEAD MINE.

SIR,—Having accepted an invitation to join a party of gentlemen on an inspection of this property, I left town on the 16th inst., and on Wednesday last, under the guidance of Captain Bennetts (late of D'Eresby Mountain) made a minute and exhaustive examination of the works underground, and also of the configuration at surface. I have returned with a very favourable impression of the mine, and convinced that the reports periodically issued are trustworthy, and by no means exaggerated. Capt. Bennetts answered with perfect frankness the very many questions addressed to him by myself and other shareholders.—Sept. 20.

A SHAREHOLDER.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

CWM DWYFOR MINING COMPANY.

A general meeting of shareholders was held, on Thursday, at the company's offices, St. Clement's House, Clement's-lane, Mr. TURNBULL in the chair.

The CHAIRMAN said that the shareholders had been called together in order that the directors might report as to the progress of the work in making the trial at the Brynarian property. Morgan's shaft, the sinking of which was commenced on Aug. 12 last, was now down a depth of 21½ fms. from the surface (the full depth required in order to start driving the 20 west). Capt. Ridge believed if this level could be started and driven west for about 12 fms. that the runs of ore in the bottom of the 10 and in the west end of the shaft would be met with, and that they could be worked to a profit. Since the meeting in July last Mr. Barton and himself had visited the mine, in company also with Mr. Davies, of Oswestry, whose report and opinion of the prospects of success would be read to the meeting.

The SECRETARY read the following report by Mr. Davies:—
Sept. 7.—I visited and examined the Brynarian and Pensarn mining properties on the 30th ult., in company with Messrs. Turnbull and Barton. I descended Morgan's shaft, which at the time of my visit was sunk 17½ fms. along the dip of the lode, with the exception of a small portion near the surface. The lode is a true lode, with well-defined hanging and heading walls; it has, roughly speaking, an east and west direction, and dips about 2 ft. per fathom north; it is about 4 ft. wide, and is composed of re-arranged fragments of the enclosing rock, together with ribs of the shaft, and other spar. The adjacent rock is blue slate and dips sharply to the south-east, which may be clearly worked. A level has been driven west at 10 fms. from surface, and for several fathoms along its floor there are ribs of lead ore; these are continued irregularly down the heading side of the lode to nearly the present bottom of the shaft where they disappear, most probably dipping to the west. On the east side of the shaft, near the present bottom, some good stones of steel-lead ore came in also. Taking the lode from the 10 fathom level downwards I should say there is from 5 cwt. to 7 cwt. of lead ore per fathom. This is not a great quantity, but it is sufficient to justify you in sinking the shaft deeper, and at 20 fms. to drive westward for 20 fms., when if the course of ore seen in the 10 is found to have increased in value you would be justified in sinking the shaft deeper, and again driving out west at a depth of 15 fms. below the 20. The work here I think well and reasonably done, and the further operations I have indicated will prove the lode sufficiently to enable you to decide on the course to pursue beyond their completion. The set is large; it is well situated, and commands a sufficiency of water power. If you had the means it might be worth while to seek for the lost lode at the Brynarian Mine, and to prove what Joseph's level would reveal, but your circumstances are peculiar, and do not admit at present of the prosecution of these works. My hope is that the runs of ore at Morgan's shaft will improve in depth, especially as they seem to have associated with them more loose spar the deeper you go.

Two letters from Capt. Ridge were also read, strongly advising the driving of a 20 west, and estimating the cost, including the work just completed in the shaft, at 138*l.*

The CHAIRMAN said that the shareholders would see from the reports just read that the appearances in the shaft now it was down to the 20 were promising, and he would certainly urge the completion of the trial, especially as the sum required was so small. The whole issue of the preference shares, even when the additional 150 shares now required to be subscribed were taken up, would not amount to 400 shares, and, as the shareholders were aware, these shares constituted a charge on the machinery at the Cwm Dwyfor which had cost over 1000*l.*

After some remarks by the shareholders present it was resolved to appeal to the shareholders to find the balance now required, in order that the result of the trial might be speedily ascertained.

WHEAL GRENVILLE MINING COMPANY.

A general meeting of shareholders was held at the offices of the company, Union-court, Old Broad-street, on Wednesday, Mr. F. G. LANE in the chair.

Mr. R. MITCHELL (secretary) read the notice calling the meeting. The following report was also read:—

Sept. 18.—Gould's Shaft: Since the last general meeting we have cut trip flat at the 150, and sunk the shaft 5 fms. 4 ft.; present depth, 8 fms. 4 ft. below the said level, on the old lode, or 7 fms. 4 ft. below the 150 on the flat lode. We expected to have intersected the flat lode ere this, but it has proved that it is not underlying the shaft where we are now, but that it is going down in line with the shaft above, consequently we have further to sink to reach the junction than we first anticipated; so far as we know now the junction of lodes will take place about the 160. We are driving a cross-cut north at the 150 to communicate with the 150 on the flat lode. The 140 east end is worth 11*l.* per fm. Two stopes in back of said level are each worth 8*l.* per fm. The 40 west end is worth about 8*l.* per fm. The stope in the bottom of said level is worth 11*l.* per fm.

Western Shaft: The 16 east end is worth 7*l.* per fm. The 150 east end is not to be worked. The 140 east end is worth 8*l.* per fm. The 130 west end is worth 7*l.* per fm. A winze going down in bottom of the 150 east, at a point about 5 fms. before the 160 east end, is worth 11*l.* per fm. In this part of the mine we have 18 stopes at work, worth in the aggregate 98*l.* per fm. Our tribute pitches are falling off in value; we have only 10 men on tribute.

Surface Work: We have finished the stack, &c., of the calciner house, erected water-wheel, and fixed a long run of launders to work the same, which is now complete, and works very well. We have fixed the 16-hd axle with two new boulders, which are working very well indeed. At the stamping engine we had to take down a part of the stack, and repaired our flues, &c.; this caused a hindrance for several days in our dressing department, and but for which our returns of tin would have been more. We have also built a coal yard at the stamping engine, and much other surface work has been done in the dressing department, so that we are now in a position to return increased quantities of tin. We regret very much the low price of tin, but this we have no control over; however, we think we have seen the lowest. The mine is opening out fairly well in going east, in which direction we are sanguine of opening up a great mine. In the 130 west level the lode has not turned out so well as we expected, although at times we have met with rich pockets of tin, but not with anything as yet that is paying and lasting. The said end within 40 fms. of our western boundary. In going east we have nearly half a mile on the line of lodes, and in which direction we feel persuaded that we shall open up a rich and lasting mine.—Sept. 17. We have bored a hole 4 ft. 6 in. in the north side of Gould's shaft, at which depth it came on the flat lode, so in another 6 ft. sinking the lode will be fairly in the shaft, when we shall at once fix a standing lift; this done, the old engine will be stopped, which will lessen our cost about 50*l.* per month. Number of men employed, 169; boys and girls, 98; total, 267.—T. HODGE, J. HOSKING.

The CHAIRMAN said the meeting had been delayed for two or three days in order to get in the four months' costs, which must be done once in the twelve months, and the directors thought it might as well be done now as at a future time. He was sorry the returns for the past four months had not come up to what was anticipated at the last meeting, but Capt. Hodge had explained the reason. The tribute pitches had not turned out so well as was expected; and moreover, the lode at the 160, at the bottom of the shaft, upon being opened upon had not turned out so favourably as was expected. The eastern operations were of a very satisfactory nature, and the lode going east was improving every fathom, and Capt. Hodge estimated that they would be able to raise, during the present three months, the full quantity of 70 tons, and after that, should the price of tin improve, as he hoped it would, Wheal Grenville would almost be in a paying condition. The present accounts showed that the company's indebtedness was something over 1600*l.*; they had, therefore, to provide for those engagements, and it was the wish of the committee, and he was sure the shareholders would fall in with it, that it should be met at the present time. When these obligations were met there would not be occasion for any more heavy calls unless an unforeseen accident occurred. A call of 5*s.* per share

would clear off the present liabilities, and he hoped that at the next meeting they might almost be able to do without a call, although he did not like to go quite so far as to pledge that. In conclusion, the Chairman moved the adoption of the accounts, and making of a call of 5*s.* per share, payable on or before Wednesday, Oct. 19, the usual discount of 5 per cent. to be allowed on all payments previous to that date.—A SHAREHOLDER seconded the resolution.

A SHAREHOLDER said that he always understood that when there was a junction of the lodes they might expect to find the returns increase; he asked whether such was the case.—Capt. HODGE said it was so.

A SHAREHOLDER said that at the western shaft, where they were supposed to get that junction, they were so near their neighbours' property that if they drove much further they would drain that property without obtaining any advantage themselves; but by sinking where they had been sinking, although they had been longer about it, still there was no doubt they would soon reach the junction. The flat lode, all through the district, made its riches at the point of junction. That was found to be the case in South Frances, which was making such good returns. Going east there was a splendid piece of ground, and with only an average price for lead they would have a good mine.

The CHAIRMAN said that South Condurrow and South Frances were the richest mines in the district, and this mine was under South Condurrow, and had hardly reached the beginning of the ore deposits. The South Frances were getting their wealth from this lode. Two years ago the shares of South Frances were at a few shillings each, but they had in the interval paid off a heavy debt, and had made a dividend of 1*s.* per share during the past quarter. This mine was not so deep as the South Frances by many fathoms. They were working towards South Frances. The Wheal Grenville expected at the 160 fm. level to find the flat lode, and between the 160 and 170 there would be another lode, which was to the north now, which would fall down upon the great flat lode. The committee were doing the best they could to make the mine a success, and if tin were at the price it was when the present committee took the management they would be making a profit now. At that time tin was 82*s.* per ton, and now only 34*s.*

Capt. HODGE, in answer to a question, said that after the next three months he hoped to be able to make larger returns. In reply to the Chairman he (Capt. Hodge) said that since he had been in charge the reserves had considerably and regularly increased. (Hear, hear.)

A SHAREHOLDER said this was an important point, and one which would tend to give great confidence to the shareholders.

The CHAIRMAN said he believed that Capt. Hodge was doing all he could to promote the interests of the company, and to reduce the expenditure. In about a month or six weeks the 150 would be communicated with the flat-rod and with Gould's shaft, and all the water would come back by Gould's shaft, which would effect a saving of 50*l.* per month by the stopping of the engine.

Capt. HODGE, in reply to a question, said that by the next meeting he hoped to be in the junction.

After some further unimportant discussion, the resolution for the adoption of the accounts and making a call was put and carried, and a cordial vote of thanks having been passed to the Chairman and committee, the meeting broke up.

MID-DEVON COPPER MINING COMPANY.

The first ordinary general meeting of shareholders was held at the offices of the company, Royal Exchange Buildings, on Thursday, Mr. JAMES WILSON in the chair.

Mr. FRANCIS R. REEVES (the secretary) read the notice calling the meeting. The report of the directors was as follows:—

The whole of the share capital having been subscribed, the company was duly incorporated and registered under the Limited Liability Act on May 21. Immediately on the formation of the company the directors took the necessary steps for the erection of the new pumping machinery at the mine, without which the prosecution of the underground workings at the lower levels was impossible, and a favourable contract was concluded on July 4 with Messrs. Green and Son, of Aberystwith, for the supply of the whole of the materials required. The old pumping-wheel has been taken down, and satisfactory progress has been made with the work for the erection of the new machinery. As soon as these alterations are completed, and the lower levels cleared of water, the work of laying open and exploring the lode at the S will be vigorously prosecuted. This being the first general meeting of the company, the whole of the directors retire from office, but, being eligible, offer themselves for re-election.

The CHAIRMAN said he had to congratulate the shareholders upon the present position and progress of the company. The whole of the capital having been subscribed, immediate steps were taken to further the progress of the mine, and develop it thoroughly by ordering new machinery. The directors seriously took that matter into consideration as soon as they had obtained all the capital, and determined to erect new machinery and to order pumping-rods of best Swedish iron instead of English. Competing prices were sent in, and the board accepted the tender of Messrs. Green and Son, of Aberystwith. He himself went down and saw the works, and was impressed with the respectability and responsibility of the people, and their prices were also the lowest. He hoped in future they would have machinery which would not only enable them to work deep enough, but also be strong enough to prevent breakages, which caused the downfall of the old company. The materials for the new work would soon be shipped by the makers; in the meantime the old wheel and old line of rods had been taken down, and the directors had entered into an arrangement with their own men at a contract price to sink the foundation in the granite, and erect the walls to carry the new wheel. It was an important piece of work, but he hoped by Christmas it would be at work, and the mine cleared of water. The directors had also taken into consideration the necessity of not depending altogether upon manual labour; and upon the advice of Mr. Roberts, one of the directors, they had looked into Hathorn's compressed air drill, which had been adopted in many mines with great success. As the money which was required for the purchase was within the reach of the directors, they might possibly take advantage of the invention, and thus push forward the work, and save a large amount of capital. They had also under consideration the question of using hand drills, which could be moved to any position, and worked by two men. The old plan was for a man to drive a chisel into the granite by a hammer, but the hand drills effected a great saving of time, and as time was money the directors might possibly see their way to employing some of these hand drills. His colleagues, Mr. Roberts and Mr. Shilson, had recently visited the mine, and would be happy to answer any questions or give any information. He moved the adoption of the report.

Mr. G. A. HILLIER seconded the resolution.

Mr. T. N. ROBERTS said he went to the mine last Wednesday with his friend Mr. Shilson, and found that the preparatory work for the reception of the new machinery was being pushed forward as rapidly as possible. The mine being cleared of water, and the new machinery being erected, the mine would be in a position to work.

Mr. D. SHILSON endorsed the remarks of the previous speaker, and said he had been connected with the mine from the commencement, and he believed that when the new machinery was erected they would have every reason to look forward with confidence to the future. The work was being carried forward in the most energetic and business-like manner.

The resolution was then put and carried.

On the motion of Mr. McLEAN, seconded by Mr. OXENHAM, all the directors were re-elected.

In answer to Mr. OXENHAM the SECRETARY said that some of the certificates were ready, and the remainder would be ready in a few days.

Mr. ROBERTS mentioned that he had seen the rock-drill at work in the Botallack Mine, and it drilled 12½ in. in five minutes and 40 seconds, whereas it would have taken a man three hours to drill through the same thickness. Again, the drill went through 12 in. of Cornish granite in three minutes 50 seconds, which it would have taken a man an hour and a half to do.

The CHAIRMAN said he had seen Hathorn's drill go through 15 in. of Aberdeen granite in five minutes.

On the motion of Mr. OXENHAM, seconded by Mr. McLEAN, a cordial vote of thanks was passed to the Chairman and directors, and the meeting broke up.

WILSON'S ROCK BORING MACHINE.—The genius of inventors has been largely directed to improved means of getting coal, of substituting mechanical means for manual labour in collieries, and in no department has there been more done of late years than in rock-boring and blasting apparatus. It is not more than twenty years since the first rock-boring machine was introduced, but great strides have been made with improvements, and now much saving of time, better quality in coals, &c., are obtained where machine drilling is employed. In these columns we have noticed the majority of the machines that have been introduced, but may here call attention to a very simple and effective machine, which has been invented by Mr. Robert Wilson, of the Railway Forge, Bishops Auckland, and has been successfully employed at a good many collieries in the great coal field of Durham, and also in that of Yorkshire. It has been found in practice that holes can be bored in the hardest whinstone in one-twelfth of the time occupied in hand drilling, and the repairs needed, even when doing the heaviest work, are not extensive. Thus it is applicable not only to collieries but to ironstone mines, fire-clay mines, lead mines, quarries, &c. Where repairs are needed the machine is so simple that any blacksmith can put matters right. A great recommendation in a drill is its fewness of working parts, and the inventor of this machine has aimed at this in the construction, but such parts as there are are of the best materials, the drills themselves being of the best cast steel. The machine is very light in construction, so light in fact that it can easily be carried in a man's hand. Thus a working miner might almost carry one of them with him when he goes to work, just as he does now with his pick and other tools, but then it must be remembered that fewer men would be required to operate a mine. These machines are adapted to work in any height or seam, and will bore a hole as any

angle, or will put a horizontal hole in either at the top or bottom. It can also bore a pump hole without being shifted or altered. What with machine boring and electric blasting the raising of coal will be carried on in future in a different style from what it was in the olden time, and from what it is at present also. Mr. Wilson, we are told, is about to bring out a machine for pressing down coal, thus saving blasting, and not content with this he has just designed an apparatus for drawing props in the "broken," which too, if successful, will prevent such accidents as arise through the present mode of shot firing and prop drawing. Either of these machines can be attached to the boring machine frame.—*Iron and Coal Trades Review.*

FOREIGN MINING AND METALLURGY.

The intelligence recently communicated as to the letting of contracts for 50 locomotives for the Belgian State Railways is confirmed. The exact number of locomotives to be contracted for is 54; part of these engines are 30-ton passenger locomotives, and the remainder 44-ton ten-wheeled goods engines. There appears, however, to have been some little confusion upon one point; the contracts for these engines are not actually let, but are about to be let. Contracts for 7000 tons of rails and accessories are to be let at Brussels, Oct. 2. The value of the rails exported from Belgium in the first seven months of this year presented a diminution of 62,600/ as compared with the corresponding exports in the corresponding period of 1877. The value of the other descriptions of iron exported from Belgium in the same period exhibited, however, an increase of 274,400/. The Providence Forges Company has just held its meeting for the year ending June 30, 1878. The balance available for dividend for the year was 14,194/., out of which a dividend of 2/ per share was declared. The general production of the works in 1877-8 was 103,580 tons of pig and 56,214 tons of iron; these figures show an increase of 22,772 tons in the production of pig, and of 7636 tons in the production of iron, when compared with the returns for the year 1876-7.

The Belgian coal trade has not as yet experienced much change. Although the winter is now close at hand prices have experienced no advance. Deliveries have, however, been pushed forward to the sugarworks, which will soon be in full activity. The value of the exports of coal from Belgium in the first seven months of this year presents an increase of about 148,000/., as compared with the corresponding period of 1877. The value of the imports of coal into Belgium in the first seven months of this year has remained about the same as in the corresponding period of 1877. Belgian coal-owners have been neglecting no opportunity to obtain additional outlets for their products, and they do not appear to have been altogether unsuccessful. A brochure which has just appeared at Amiens on the canals of the Sambre shows that the dues charged for the conveyance of coal via the Sambre are much higher than those charged via the Escaut and St. Quentin route.

Some improvement has been noticed in the coal trade at Paris, but this improvement has not extended at present to industrial coal. In the department of the Nord the movement noticed in the coal trade a fortnight since, and which is due to the supplies which are being laid in by the proprietors of sugarworks, still continues. In connection with the future supply of coal required for sugar manufacturing purposes, it may be observed that the sugar beet crop promises well. The rains which fell in the latter part of August greatly increased the size of the plants, and the hot weather which followed produced the saccharine richness which was lacking. Under these circumstances the producers of beet root sugar have not hesitated to purchase coal with a certain freedom. Apart from this, comparatively few purchases of coal have been made in the Nord, as the coal trade of the district suffers rather sensibly from English and Belgian competition. In the basin of the Loire some improvement is observable in the state of the collieries; thus coal merchants are making purchases, and the industrial works, which are reckoning on a revival of affairs in an early future, are also laying in supplies. Prices have not revived at present, but it may be expected that they will improve if the present movement should continue. The Moktael-Hadid Magnetic Iron Minerals Company has just purchased for 204,000/ the Rochebelle Colliery concession, which has hitherto belonged to the Alais Mines, Foundries, and Forges Company.

In the French department of the Haute-Marne the orders received for iron are comparatively insignificant; they relate almost entirely to iron of the third and fourth classes. Two orders of some little importance have been offered, but only on condition that a reduction of 4s. a ton is submitted to in prices, and to this the makers to whom the proposals were made have refused to submit. Rails are quoted at 6/ 8s. per ton; mixed iron at 7/ 12s. per ton; and machine iron, No. 20, at 7/ 12s. per ton. English plates have brought 8/ 16s. to 9/ per ton; sheets have been sold to some little extent at 8/ 8s. to 8/ 16s. per ton. Work has slackened in the foundries, and comparatively few contracts have been concluded for rough pig. Ordinary refining pig remains nominally at 4/ 4s.; the superior pig of Cessons is placed in small lots at 4/ 14s. 4d. to 4/ 16s. per ton. In the Nord some contracts have been proposed, but at such low rates that they have not been accepted by producers. The Chatillon and Commeny Forges Company has commenced the payment this week of a dividend of 19s. 2d. per share. This distribution represents the balance of the dividend for 1877. The Loire Mines Company will pay on Oct. 16 an interim dividend for 1878 at the rate of 2/ 11s. per share.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

CWM CLOCH SLATE QUARRIES COMPANY (Limited).—Capital 30,000/., in shares of 1/4. To acquire by payment, exchange, or otherwise any quarries, leases, or licenses situate in or near Beddgelert, and exploring and working more particularly the Cwm Cloch Slate Quarries, and to purchase and otherwise acquire any other quarries in the United Kingdom. The subscribers are—H. D. Bailey Williams, Avon Villa, Carnarvon, farmer, 3500; G. Parry, Glanrafonbach, Llanbelleg, Carnarvon, farmer, 1000; L. P. Allen, Llanrwg, Carnarvon, landowner, 200; F. M. Allen, Glyn Pendower, Carnarvon, landowner, 200; H. B. Williams, Pantafon, Carnarvon, clerk in orders, 500; J. Horsfall, Walsden, near Todmorden, manager, 500; J. H. Farrow, Elmsmere place, Westlynton, auctioneer, 100. The following are the directors:—H. B. Williams, L. P. Allen, J. Horsfall, H. D. B. Williams, James H. Farrow.

ISAAC COLBECK AND COMPANY (Limited).—Capital 100,000/., in 5/ shares. To carry on business as woollen manufacturers, &c. The subscribers are—Isaac Colbeck, Brier Hall, Burstall, 4000; F. W. Reus, Dewsbury, 20; G. F. Hammond, Batley, 20; W. Ward, Batley, 20; W. Hubbard, 9, Bow Church-yard, 50; J. Andrews, 8, Craigs-court, 50; W. R. Crozier, 84, King William-street, 20.

PLANTERS' STORES AND AGENCY COMPANY (Limited).—Capital 50,000/., in 10/ shares. To acquire the goodwill and business of the Planters' Stores Company (Limited), a company registered under the Indian Companies Acts, and to carry on business at London, Calcutta, and elsewhere, as planters and general agents, merchants, &c. The subscribers (who take one share each) are—James Warren, Capel House, Enfield; H. Hopkinson, 106, Commercial-road; F. Appleford, The Cedars, Woodbury; W. C. S. Jefferson, 21, Litchfield-road, Finchley; Joseph Parry, Sylvia House, Caterham; C. J. Stewart, 4, Sugar Loaf-court; E. R. Slocombe, The Hollies, Teddington.

THE LAMORNA HARBOUR AND GRANITE WORKS (Limited).—Capital 25,000/., in 5/ shares. To acquire the lease of the Lamorna Harbour granite quay and buildings, in the parishes of St. Buryan and Paul, Cornwall, also to acquire the Lamorna Harbour property, in the same parishes. The subscribers are—Frederick Thomas, Palmers-on House, Exeter, 5; E. Bradshaw, 1, Regent-street, Exeter; George Wretford, Oakville, Ankerley, gentleman, 5; G. Glanville, Devereux Buildings, Strand; F. Bartlett, Exeter, 5; John Bartlett, The Rectory, Grampound, Cornwall, 5; H. R. Snelgrove, 7, Craven-street, Strand, 5.

OSTRICH FARMING AND FEATHER COMPANY (Limited).—Capital 50,000/., in 500/ shares. To carry on business as ostrich farmers, &c., in South Africa. The subscribers (who take one share each) are—H. E. S. Abbotts, 159, Ledbrooke Grove; William Kingland, Tamford Brook Lodge, Chiswick; B. C. Campbell, The Oriental; S. Sadler, 8, Carter Chambers, Regent-street; John Dixon, 15,

Hardley-crescent; James East, 18, South Lambeth-road; W. Ruston, 140, Stockwell-road.

MUTUAL DRESS SUPPLY ASSOCIATION (Limited).—Capital 100,000/., in 5/ shares. To carry on business as milliners, drapers, &c. The subscribers (who take one share each) are—Frederick Hill, 363, Kennington-road; G. Collier, 27, Surrey-street, Little-hampton; James Crowe, Stockwell; G. Mallen, 8, North Buildings, Eldon-street, Finsbury; J. E. Harding, 30, Badger-row; Arthur Smith, 7, Half Moon-crescent, Barnsbury; E. Miller, 12, Ponsonby-terrace, S.W.

HAMPSHIRE CO-OPERATIVE MILK COMPANY (Limited).—Capital 10,000/., in shares of 10/4. To acquire farms, lands, buildings, &c., for the purposes of the company's business. The subscribers (who take one share each) are—T. M. Cadge, 26, Bishopsgate street Within; E. Comfort, 122, Great Suffolk-street, Borough; S. Butcher, Winchfield; J. Hirschorn, 131, Amburst-road, Hackney; J. McLachan, Metropolitan Chambers, Broad-street; J. H. Guider, 46, Gresham-street, E.C.

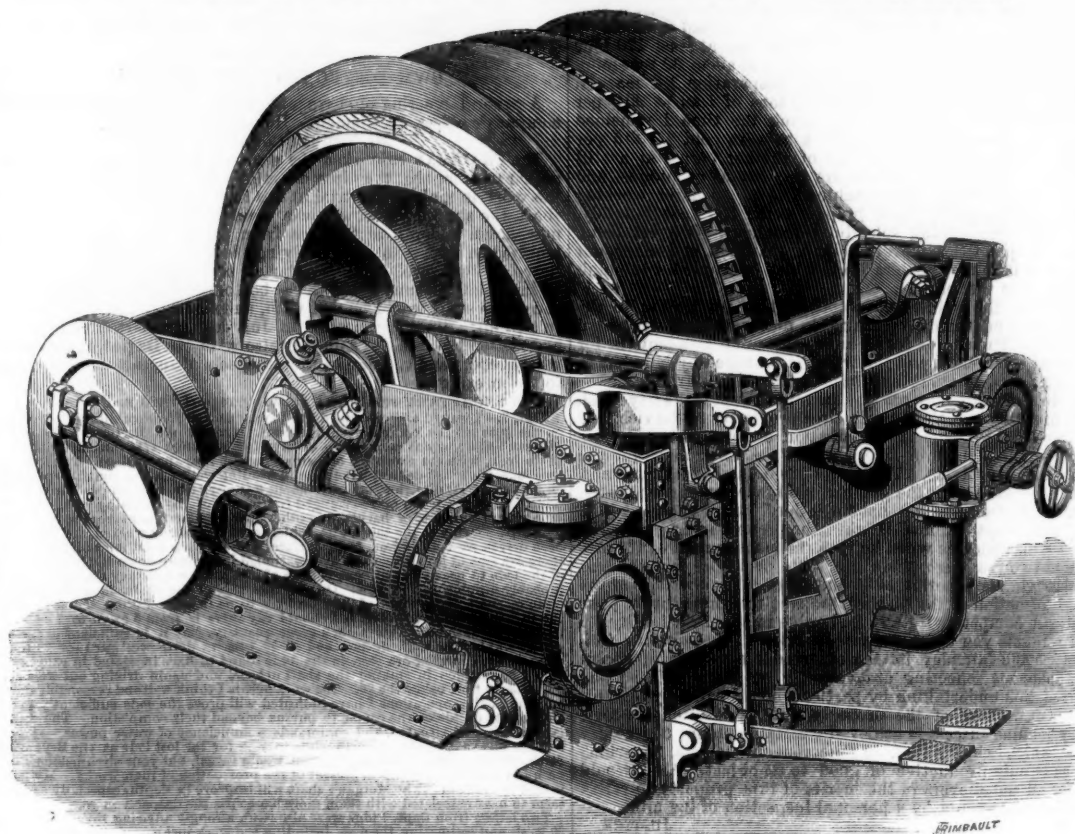
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UNDERGROUND HAULING ENGINE.

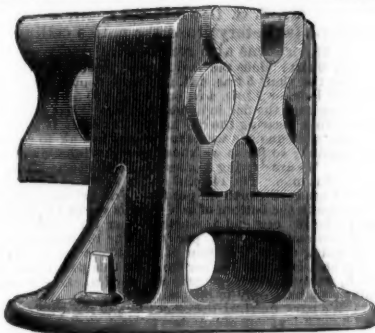


UNDERGROUND HAULING ENGINE.
STEVENS' PATENT.

UNDERGROUND HAULAGE is a subject which has largely occupied the attention of mining men during the last few years, and every attempt to substitute mechanical power for animal labour is deserving of attention. The engine which we illustrate is especially designed for using steam or compressed air underground; it is

quite complete in a frame of boiler-plate, and is consequently unaffected by any disturbance in the floor of the mine, and its extreme compactness reduces the quantity of ground to be cut for its reception to a minimum. These engines are being manufactured by the Uxside Company, of Newport, Monmouthshire, who, we understand, have them at work in nearly all the mining districts of the country.

ALDRED AND SPIELMANN'S PATENT TRAMWAY.



Reference was made in the *Mining Journal* of July 27, when a full illustrated description of the invention was given to an ingenious and economic system of tramway introduced by Messrs. Aldred and Spielmann, of Queen Victoria-street, and on Friday last a number of tramway and other engineers interested in tramway construction assembled, in the Hampstead-road to view the laying of the new tramway rails. The system is totally different from anything that has yet been tested, the rail being in two parts, as seen in the diagram. The section is the same in each case and when the upper rails wear down they can be reversed and used the other side. The joints of the rails in this system are, perhaps, the best features in it, as they break in the chairs, and then only half in one place, and from the form of the chairs and keys which secure the rails it is utterly impossible for the joints to move or to become uneven. It should, we think, also be mentioned that these rails can be reversed or renewed when required without the necessity and expense of cutting up any of the roadway except one stone at every chair, so as to remove the key. The chairs and cross sleepers are 4 ft. centre to centre. Much satisfaction was manifested by the visitors, all of whom were thoroughly well pleased with the novel and business-like appearance of this tramway line, which, after possessing the above named advantages, can be laid for a smaller sum per mile than almost any other; indeed, it must be the opinion of all who have seen this system that there is a great future for it.

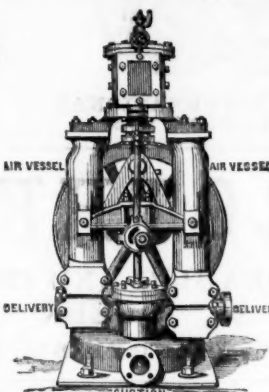
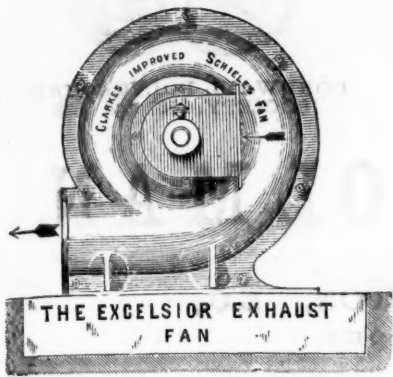
The new tramway is entirely free from the objection of rendering the roads uneven, and consists of a reversible rail, divided into two sections; each section forms a tread rail and guard edge. When laid the guard edge of one part of the rail is placed against the tread part of the other, the touching surfaces of each are so designed that they fit compactly together by their own weight, and the rails are held in suspension by resting on the cushion of the chair on the one side, and the wedge or key fitting partly in the hollow of one of the rail sections and the jaw on the other side of the chair. The chairs are firmly fixed by bolts into transverse

sleepers; these sleepers are thoroughly set in a good bed of concrete, as will be seen by the height of the chairs, which, by their peculiar construction, also admit of a drainage. Thus it will be noticed that when the upper surfaces of the rails have been worn away the under surfaces can be reversed, so as to form a surface equal to the upper when first laid, and what must be considered as a great advantage in this patent is that this can be done with little trouble, and without disturbing more than a small proportion of the roadway, seeing that only the sets adjoining the chairs must be removed. Another great feature must not be overlooked in this system, and that is the mode of jointing; upon looking at the joints of the tramway, as laid in London, a great deal of springing will be observed, this is obviated by the new patent since the sections are so arranged in their lengths that the tread rails do not meet where the guard edges do; this saves all fish plating, &c. If the simplicity of arrangement and rigidity of the system be taken into account, the complaints sometimes urged against tramways in the street are not likely to be heard at any place where the new system is adopted. The system has much to recommend it, since it has all the appearance of being durable and economic.

AMIANTHINE COAL.—The name amanthine coal has been given to an artificial fuel, invented by Mr. Roher, of Toul-use, and which appears to be especially adapted for heating public conveyances or for use in workshops or laboratories where an open fire without a chimney is required. Mr. Roher desired to produce a fuel in the combustion of which the least possible quantity of carbonic acid is disengaged, while a pleasant and healthy odour is evolved. The amanthine coal is of a cheap nature, and, being dense, affords with a considerable and constant heat, burning freely, but slowly, producing no smoke, and requiring no special apparatus for effecting its combustion. The essential ingredients are green, white, or blue amanthus, or flexible asbestos, which is capable of subdivision into small particles in water, and which, when intimately mixed with other substances, forms a sort of fibrous paste, possessing when dry great elasticity, whereby it is enabled to stand considerable transport without breaking, and the ashes of which after combustion retain the original conglomerate form of the fuel. Moreover, the amanthus fibres in each fuel block, while it is burning, remain unconsumed, and serve to transmit the heat to the surface of the block. As regards the development of carbonic acid, the green amanthus in particular is of great value, being composed of silicate of lime, silicate of magnesia, and peroxide of iron, which by its combustion is further oxidized, as shown by the change of colour of the fibers from green to rusty brown, and thus its effect is much the same as that of the pieces of iron sometimes placed in brasiers for the purpose of raising the carbonic acid. In order further to neutralize the carbonic acid as far as possible, with the amanthus is mixed fat lime, which, when formed into a paste therewith, also acts as agglutinating material, imparting great solidity to the fuel. In place of the lime may be employed other known agglutinating materials, such as charcoal, or acetate of lead, or nitrate of soda or lime, or substances having analogous properties. Thus, for one description of the fuel, 1000 parts of charcoal, 100 parts of amanthus, 25 parts of gum, 1500 parts of water, and 100 parts of acetate of lead are mixed; for another description, 1000 parts of soda, and 180 parts of amanthus, 60 parts of lime, 55 parts of nitrate of soda according to the 1500 parts of water. The above proportions may be modified according to the purposes for which the fuel is to be employed. The charcoal and amanthus are reduced to a fine state of subdivision, and are then mixed together; the mixture of lime or analogous substance is also pulverized, and then mixed with the other two substances, and to this compound is then added the water in which the agglutinating material, gum or lime, has previously been dissolved or suspended. The compound being then stirred so as to incorporate all the ingredients as thoroughly as possible, forms a pliable paste. This paste is placed in moulds to form bricks, or blocks, which are dried either in the open air or in a stove.—*Scientific American*, Sept. 7.

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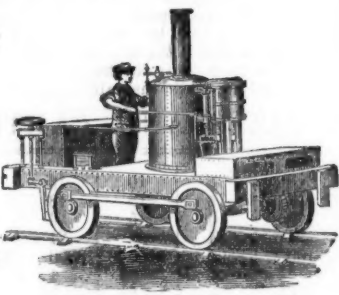
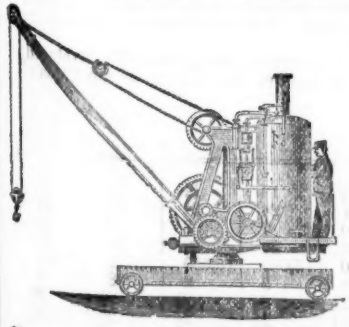
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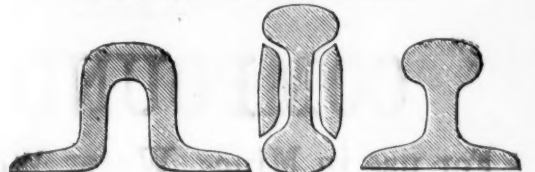
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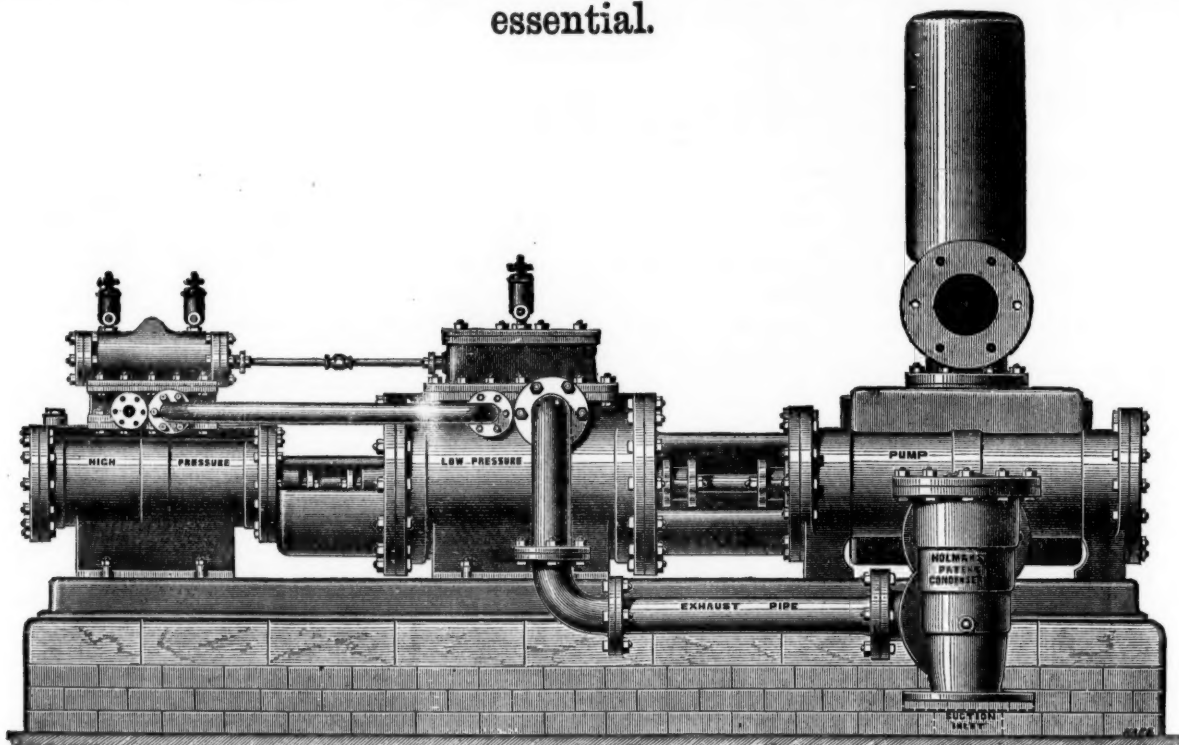
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Ditto of Water Cylinder.....In.	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke.....In.	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate.....	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Diameter Suction and Delivery.....In.	3	3½	4	3½	4	5	6	4	5	6	8	5	6	8	9
Diameter High-pressure Steam Inlet.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½
Diameter Low-pressure Steam Exhaust.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder.....	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser.....	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser.....	600	384	267	600	417	306	335	600	440	337	216	600	459	203	203

CONTINUED.

Diameter of High-pressure Cylinder.....In.	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30
Ditto of Low-pressure Cylinder.....In.	28	28	28	28	32	32	32	32	36	36	36	42	42	42	52
Ditto of Water Cylinder.....In.	8	10	12	14	8	10	12	14	10	12	14	10	12	14	14
Length of stroke.....In.	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate.....	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,950	47,950
Diameter Suction and Delivery.....In.	6	8	9	10	6	8	10	10	8	9	10	8	9	10	10
Diameter High-pressure Steam Inlet.....In.	2½	2½	2½	2½	3	3	3	3	3½	3½	3½	4	4	4	5½
Diameter Low-pressure Steam Exhaust.....In.	3	2	3	3	3½	3½	3½	3½	4	4	4	5	5	5	6½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder.....	360	230	160	118	456	292	202	140	397	276	202	518	360	264	562
Ditto ditto ditto—with Holman's Condenser.....	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750
Ditto ditto ditto—with Air-pump Condenser.....	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937

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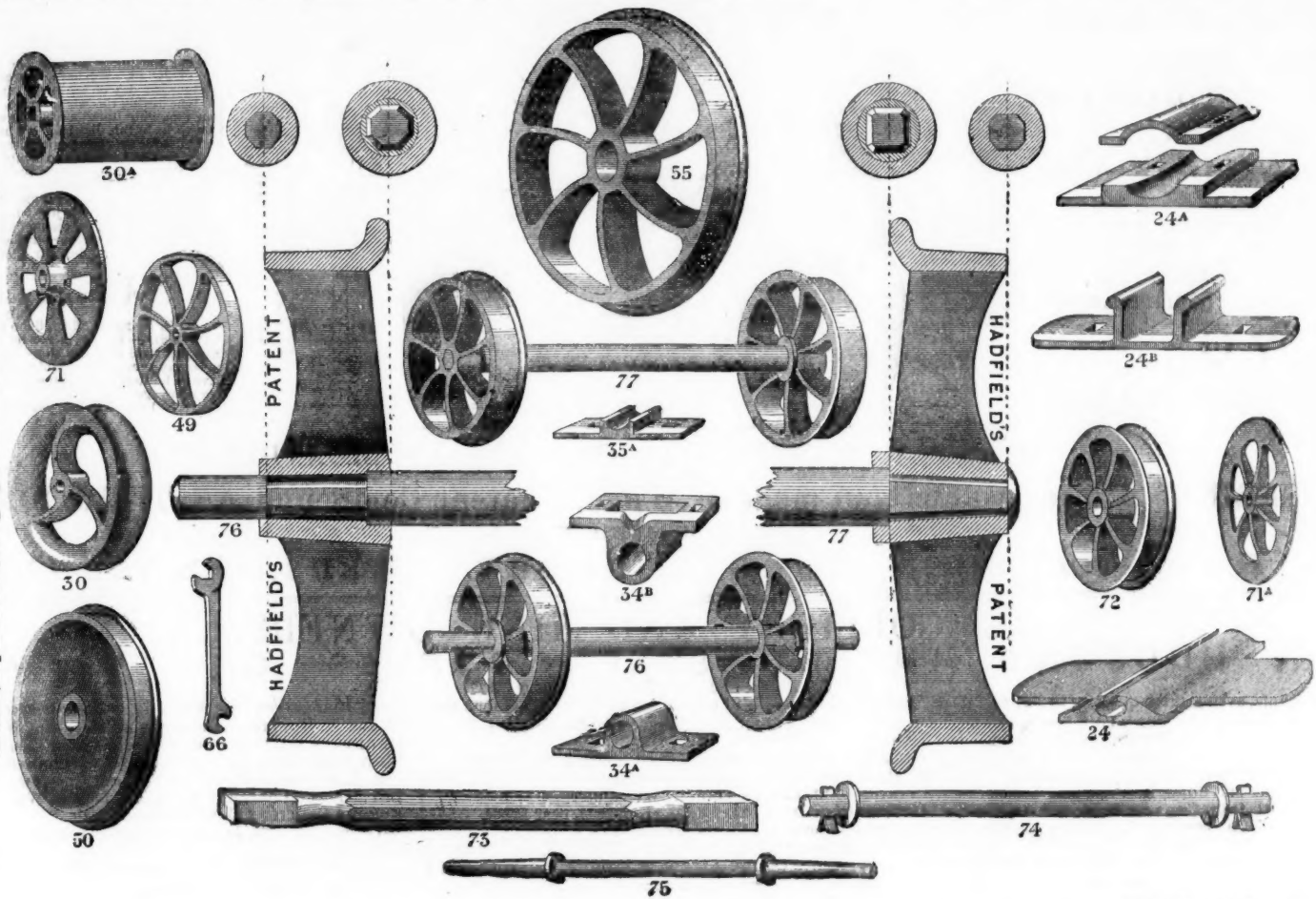
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One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.

N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axles and rolling load.



[This Sheet of Drawings is Copyright.]

HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heavily fitted on, and run exceedingly true. We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material. CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely. We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

HARRIS'S PATENT WROUGHT-IRON WINDOWS.

DOME AND OTHER ROOF LIGHTS, FLOOR AND PAVEMENT LIGHTS, ETC.



GREAT BRITAIN,
UNITED STATES OF AMERICA,

ARE STRONGER, SUPERIOR, AND CHEAPER
THAN ANY OTHER METAL SASHES YET
PRODUCED—COST LESS FOR GLAZING—
ARE AS CHEAP IN MANY CASES AS WOOD

Private Houses,
Parsonage Houses,
Farm Houses,
Churches,
Chapels,
Schools,

ILLUSTRATED CATALOGUES
ON APPLICATION.

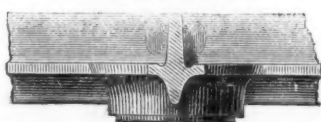
In Basement Storeys and Exposed Positions Shutters
and Guard Bars are dispensed with.

HOME AND

SOLE MAKER—J. T. HARRIS, Engineer, Ironfounder, and Manufacturer,

SAFE, STRONG ROOM, AND PARTY WALL DOORS, AND EVERY KIND OF CONSTRUCTIONAL AND BUILDERS' IRONWORK, LIFTS, HOISTS, ELECTRIC BELLS AND TELEGRAPHS, &c.
90, CANNON STREET, LONDON, E.C.; AND BEAUFORT IRONWORKS, BRISTOL.

PATENTED IN



FRANCE,
GERMANY, AND BELGIUM.

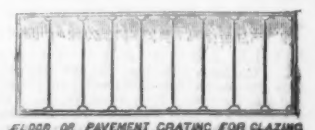
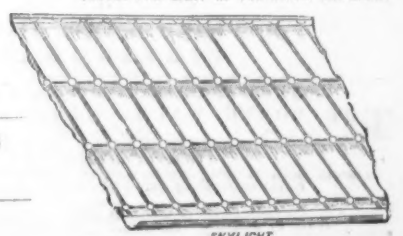
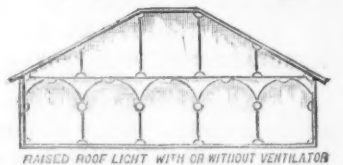
—CAN BE DESIGNED AND MANUFACTURED
TO SUIT ANY STYLE OF ARCHITECTURE
OR POSITION WHERE A WINDOW MAY BE
REQUIRED.
ARE BEING EXTENSIVELY USED IN—

Lunatic Asylums, &c.,
Public Buildings, Banks,
Wharves, Warehouses,
Factories, Mills,
Breweries, &c.,
Engine Houses.

ILLUSTRATED CATALOGUES
ON APPLICATION.

Security is obtained in
these Skylights with-
out Guard Bars, and
with less obstruction
to Light.

EXPORT.



At the PARIS EXHIBITION the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION

FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,
in Sections, with Patent
Faced Backs.

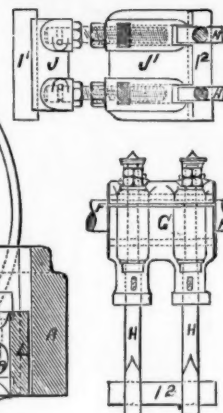
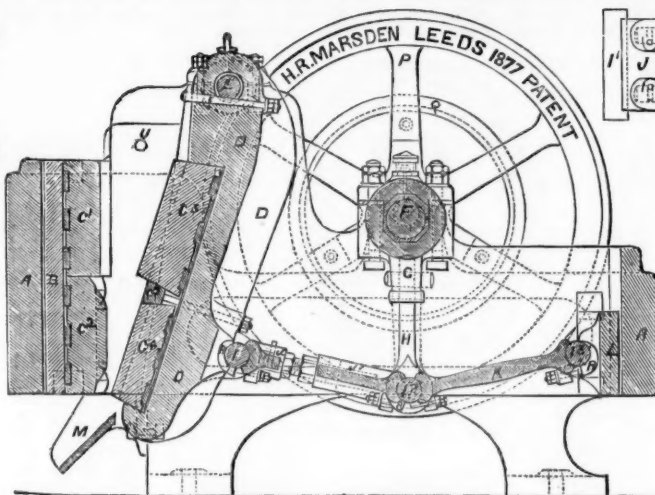
NEW PATENT ADJUSTABLE
TOGGLES.
OVER 2500 IN USE.

New Patent Draw-back
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharhole Lime Works, Maryport, Whitehaven,
November 7, 1873.

H. E. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.
DEAR SIR,—The machine I have in use is one of the large
size, 24 in. by 12 in. The quantity we are breaking daily with
this one machine is 250 tons, the jaw being set to break to a
size of 2 1/2 in. We have, however, frequently broken over
300 tons per day of ten hours, and on several occasions over
350 tons during the same period. The stone we break is the
blue mountain limestone, and is used as a flux in the various
ironworks in this district. We have now had this machine in
daily use for over two years without repairs of any kind, and
have never had occasion to complain of any inconvenience in
using the machine. I hope the one you are now making for
me may do its work equally well. The cost—INCLUDING EN-
GINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES
OF EVERY KIND—is just 3d. per ton. Should any of your
friends feel desirous of seeing one of your machines at work,
I shall have much pleasure in showing the one alluded to.
I am, dear Sir, yours very truly
WILLIAM MILLER.

AND THIS—

Wharhole Lime Works, Aspatria, Cumberland,
July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.
DEAR SIR,—We are in receipt of your letter of 4th inst. I
may just state that the stone breaker above named has been
under my personal superintendence since its erection, and I
have no hesitation in saying that it is as good now as it was
five years ago.
I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

TO COLLIERY AND MINE OWNERS.

R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwt. "dead" weight per corve. Will hold 2 to 3 cwt. more coal than the ordinary kind, without increasing the outside dimensions. Adopted by—
Messrs. THOMPSON, WISE, & Co., Burry Port, South Wales. Messrs. BARING, GOULD, & ATKINSON, Diamond Fields, South Africa.
Messrs. DYMOND'S Liversedge Coal Company, near Leeds. Messrs. KIMBERLEY, Diamond Mines, South Africa.
Messrs. W. ACKROYD and Bros., Morley, near Leeds. Mr. HASELDEN'S Lead Mines, Linares, Spain.
Messrs. CLAYTON and FREIGHT, Farnley, near Leeds. FRYSTON COLLIERY Co. (Limited), Castleford, near Leeds.
Messrs. JAS. WORMALD and Sons, Rawdon, near Leeds. HOWDEN CLOUGH COLLIERY Co. (Limited), near Leeds.
KINGSWOOD COAL and IRON Co., near Bristol. Messrs. RUSHFORTH and Co., Adwalton, near Leeds. Messrs. JAS. FUSSELL, Sons, and Co., Frome, Somersetshire.
MIDDLETON COLLIERY Co., near Leeds. NEWTON COLLIERY, near Castleford. T. VAUGHAN and Co.'s TRUSTEES, South Medomsley Colliery; and others.

R. HUDSON, Engineer and Ironfounder, Gildersome Street Foundry, near Leeds (Five minutes walk from Gildersome Station, G.N.R.)

The Barrow Rock Drill COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY
ONES that have been SUCCESSFULLY WORKED in the
MINES of CORNWALL. At DOLCOATH MINE, in the
HARDEST known ROCK, a SINGLE MACHINE has, since
its introduction in July, 1876, driven MORE THAN THREE
TIMES the SPEED of HAND LABOUR, and at TWENTY PER
CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together,
and at a proportionately increased speed. They are strong,
light, and simple, easily worked, and adapted for ends and
stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS,
and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,
LISKEARD, CORNWALL.

IMPROVED STEEL WIRE FOR ROPES.

WEBSTER & HORSFALL,

(ORIGINAL PATENTEES),

MANUFACTURERS OF IMPROVED STEEL WIRE FOR ROPES
FOR COLLIERIES,

RAILWAY INCLINES, PLOUGHS, HAWSERS, &c.

SOLE MANUFACTURERS OF the HOMOGENEOUS WIRE for the
ATLANTIC CABLES of 1865 and 1866.

WEBSTER AND HORSFALL,
BIRMINGHAM.

THE GREAT ADVERTISING MEDIUM FOR WALES.

THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857,
the largest and most widely circulated papers in Monmouthshire and South Wales
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three P.M., the
second edition at Five P.M. On Friday, the "Telegram" is combined with the
"South Wales Weekly Gazette," and advertisements ordered for not less than six
consecutive insertions will be inserted at an uniform charge in both papers.
P.O.O. and cheques payable to Henry Russell Evans, 14, Commercial-street
Newport, Monmouthshire.

THE IRON AND COAL TRADES' REVIEW.
The IRON and COAL TRADES' REVIEW is extensive, circulated amongst the
Iron Producers, Manufacturers, and Consumers, Coalowners, &c., in all the iron
and coal districts. It is, therefore, one of the leading organs for advertising every
description of Iron Manufactures, Machinery, New Inventions, and all matters
relating to the Iron, Coal, Hardware, Engineering, and Metal Trades in general.
Offices of the Review: 7, Westminster Chambers, S.W.
Re mittances payable to W. T. Fringle.

THE "CHAMPION" ROCK BORER

MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED
IRON PIPES, &c.

Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected
by this machinery, on application.

CONTRACTS TAKEN, OR SPECIAL TERMS FOR HIRE.

ULLATHORNE AND CO., 63, QUEEN VICTORIA STREET, LONDON, E.C.

THE ROANHEAD ROCK DRILL.

BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will
work in the hardest rock without more than the usual repairs re-
quired by any ordinary machinery, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 to 60 ft.
in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the most
simple rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers.—

SALMON, BARNES, AND CO.,
MINING ENGINEERS.

Canal Head Foundry and Engineering Works, Ulverston.

J. WOOD ASTON AND CO., STOURBRIDGE
(WORKS AND OFFICES ADJOINING CRADLEY STATION),
Manufacturers of

CRANE, INCLINE, AND PIT CHAINS,
Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES

FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS,
RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Orab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.
STOURBRIDGE FIRE BRICKS AND CLAY.